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Original Contributions.

IMPACTED TEETH AND METHODS OF EXTRACTION; CLASSIFICATION, ACCIDENTS TO BE AVOIDED, INSTRUMENTS AND ANESTHETIC,

BY F. K. REAM, M.D., D.D.S., CHICAGO, ILL. READ BEFORE THE MC LEAN COUNTY DENTAL SOCIETY AT BLOOMINGTON, ILL., SEPTEMBER 23, 1907.

The profession generally concedes that there is no department of dental practice producing such strain on the vital forces as the extraction of teeth. That "delicacy of manipulation" made famous by the illustrious Cushing, so essential to the dentist, is greatly curtailed after a seance and turmoil with the average hyper-sensitive patient. Occasionally a dentist is found who is well supplied with ability and confidence in this class of work, and attains more than ordinary success. The great bug-bear hitherto has been the mastering of the anesthetic, or rather methods of administration. Anesthesia obtained by the old method was too short in duration in the hands of the average practitioner to permit satisfactory operating. Now that we are enabled to prolong the effects of nitrous oxid gas by the nasal inhaler, the blame lies largely in the college curriculum, concerning which I shall say more later on in this paper. To be a successful extractor of teeth the dentist must be especially tactful in handling his patients, know how to inspire confidence, and, above all, he should be free from radicalism, which has no place in dentistry; for no single anesthetic, instrument or method will meet the requirement of the extractor any more than one filling material will meet all requirements.

Difficult cases will present where he will be placed at his wit's

end, but with careful study, persistence and sticktuitiveness this work may be mastered by every practitioner. After deciding upon the operation to be performed, the first consideration is the selection of the anesthetic, whether local or general.

After 17 years' practice without a single accident, I believe there is but one anesthetic, viz.: nitrous oxid; for after strenuous efforts and years of toil by varied commercial concerns to hoodwink the dental profession, and after many accidents and deaths, the profession is returning, like lost sheep, to the old and time-tried nitrous oxid. It is said, "God might have made a better fruit than the apple," but he did not. Neither has science, up to the present time, discovered a safe and reliable substitute for nitrous oxid. Hospitals all over the country are equipped with apparatus for its administration; and leading surgeons in Chicago and other great cities are advocating its use in capital operations. The famous surgeon, Dr. Arthur Dean Bevan of Chicago, in the Journal of American Medical Association, July 20, 1907, says: "Nitrous oxid gas has until recently been left to the dentist and for minor operations, although years ago the feasibility of employing it for prolonged anesthesia was thoroughly demonstrated by Bert Andrews and others."

In the last eight or ten years nitrous oxid has been more extensively used by the general surgeon, especially, however, in the sequence of nitrous oxid and ether. In this, I believe, it has no very great value, except that it offers an agreeable anesthesia to the patient. During the last three or four years I have been employing nitrous oxid and air as a general anesthetic in an increasing number of cases, and I have been so much impressed with its value and the possibilities of its wide application that I have felt warranted in bringing this matter briefly before you for consideration.

Roughly speaking, chloroform anesthesia has a mortality of 1 in 2,000, ether 1 in 5,000, and nitrous oxid gas 1 in 50,000. But, by way of parenthesis, I desire to inform you that there never has been an authenticated death where nitrous oxid and oxygen have been used. Until reading Dr. Bevan's article, I had believed the mortality to be 1 in 100,000, and, I am of the opinion, that this has been in cases where the so-called vitalized air or a com-

bination of chloroform and gas, or other hypnotic agents were used.

Dr. Bevan goes on to state: "It is seldom followed by nausea or vomiting, pneumonia, bronchitis, nephritis or secondary changes in the tissues. If properly administered with air, an anesthesia of a half hour or an hour can be secured. I began using it in cases where ether and chloroform were specially contraindicated, as in operation on the kidneys, in nephrotomy for anuria, abscess, etc. I then extended it to kidney-stone operations and nephrectomies. Finding how easy it is to maintain satisfactory anesthesia for long periods, I have gradually increased the realm of its use until now I am employing gas in a large proportion of my general surgical cases.

It is the anesthetic of choice in reducing fractures and dislocations, in opening abscesses and felons, in breaking up adhesions in joints, in draining empyemas and lung abscess, in exploratory laparotomies, in gall bladder work, removing stones and drainage in kidney work, nephrotomy, nephrectomy and nephrolithotomy; in bladder work, supra-pubic prostatectomy; in draining appendiceal abscesses, in colostomy, gastrostomy and enterostomy; in repair of typhoid perforation and of perforating gastric and denodenal ulcers; in hernia operations, especially for relief of strangulated hernia; in varicocele and in open operation for hydrocele; in castration; in amputations, except the largest joints, and in removing tumors, such as fatty tumors.

The great safety of the anesthesia, the rapidity of its action, the comfort with which the patient can take it, with freedom from nausea, the almost immediate recovery from the anesthesia, the great freedom from lung or kidney complication and from extensive fatty degenerations of the liver, kidneys and heart, which may follow chloroform anesthesia, and, to a less degree, ether anesthesia—all of these combine to make anesthesia by nitrous oxid gas and air the method of choice in a considerable proportion of our general surgical cases.

I desire to make a plea for an extensive, general trial of nitrous oxid gas by the members of this section; and, in this connection, I wish to make a suggestion that we appoint, as has been done by the British Medical association and by the Germans, a

committee on anesthetics which will present to this section a report of the studies and progress made each year in this important field of work."

After reading Dr. Bevan's glowing tribute to nitrous oxid, one pauses to imagine what cases remain in which the doctor would not employ nitrous oxid. Personally, I would not hesitate to administer this agent in any case where an anesthetic is to be employed.

Dentists are specializing almost exclusively in its use for general surgery, like Dr. Teter of Cleveland, reporting hundreds of cases of administrations for capital operations, one lasting two hours and forty-eight minutes in which he used 600 gallons of nitrous oxid and 80 gallons of oxygen. Upon the completion of the operation the anesthetic was withdrawn and the patient regained all of her mental faculties within one minute, and there was very little shock from the procedure. Nausea and other post-anesthetic complications were entirely absent, the patient making a speedy recovery.

Recently I was called to a Wisconsin city 300 miles distant to anesthetize an old lady 92 years of age and kept her asleep for one hour and 10 minutes, using over 200 gallons of gas and 80 gallons of oxygen. She maintained a normal, pink lavidity throughout the operation.

One of the vital conditions for the extractionist to meet is to guard against accidents. The inaccessibility of his field of operation, inability to control hemorrhage, care of the anesthetic and the preservation of tissues, renders his task a most difficult one. At one of my clinics in Chicago, a specialist, after examining a badly impacted lower third molar, publicly remarked "that he would rather amputate a leg than attempt the removal of the tooth," and well may it be said. Compare the surgeon with his open field of vision, absolute control of hemorrhage, no care of the anesthetic, and his corps of assistants, with the dental surgeon. In the many accidents that may occur in the extraction of teeth the most common is the fracture of teeth usually occasioned by failure in grasping the tooth deeply, by using forceps with thick, heavy beaks, making it almost impossible to reach well up on roots. It is quite easy to do this if sharp, small alveolar beaked

forceps are used. It is not impossible for the operator to extract the wrong tooth, removing a second instead of a third superior molar. To avoid this the teeth should be carefully counted—1st, 2d and 3d. I believe this has occurred sometime in the life of every operator who has extracted many teeth. Among the more serious accidents is the passage of teeth into the trachea. Cases are on record where great suffering has been occasioned and even death from this cause. This may be avoided by operating for patients sitting in an upright position. The lower maxilla may be fractured in the extraction of lower third molars—the only authenticated cases I have known, have been in the angle of the jaw where too much force was employed in the removal of the lower third molars. Violence and great force should not be used. The teeth should be carefully dissected out and tested until liberated and then removed.

One of the most trying and distressing conditions is the disappearance of a lower third molar in the submaxillary fossæ during an effort in extraction. I will show you a radiograph of a tooth lying deep in the jaw that demanded two hours of arduous labor to remove, and I do not think that there is a dentist present who will believe a tooth could lodge so deeply, unless the X-ray had revealed its location. Some years ago I was called in consultation with three specialists to examine a similar case and it was the opinion of the majority that the patient had swallowed the tooth and that it could not possibly be in the jaw. The wound was packed, however, for three days and the patient dismissed after very thorough examination. Six months later the patient was taken to the hospital and the tooth removed from an external opening in the jaw. These are rare experiences, and I trust this particular case will be carefully noted.

One of the distressing features of this work is the extensive destruction of gum tissue. When the operator sees that the forceps cannot be pushed between the gum and process, he should lightly inject the gum with a local anesthetic and carefully loosen the tissue, thus the mouth may be preserved.

In conclusion, I desire to present what I consider a rational summary of these teeth under three heads, namely:—prophylactic, palliative and surgical. The first indicates the early extraction of

these teeth. The majority of suffering could be avoided if the dentist would advise the patient to have the teeth removed, cautioning him of the great danger attending their retention and of the likelihood of caries of the second molar.

By palliative treatment I refer to cases presenting inflamed conditions, aggravated by the constant irritation of movement of the jaw, due largely to pressure from the superior third molar, in which case the latter should be removed and the patient instructed to use antiseptic washes and apply counter-irritants to parts daily. After swelling and pain have subsided the impacted tooth should be removed. Great care and judgment should be exercised in the selection of the time and conditions of the parts for operation to avoid alveolar abscess, as the conditions are not at all analogous to other parts of the mouth. For instance, active inflammation and swelling should be reduced by the above treatment, saline cathartics and hot fomentations employed; occasionally patients are so emaciated and exhausted that confinement in bed and the administration of opiates are indicated.

Any effort in extensive operating which produces pressure in opening the mouth of the patient in a trismus condition of the masseter muscle is liable to extend the abscess and distribute the inflammation throughout the cellular tissue in that locality.

Surgical interference consists in the removal of the teeth, and the modus operandi is as follows: If of sufficient gravity a radiograph should be made to determine the exact location of the tooth, whether multiple or single rooted. The tissues should be cocainized and with the dental engine and medium sized rose-head fissure burs freely cut away the process surrounding the tooth. The parts should be flooded with an antiseptic solution during the operation. A thin concave disc must be used to cut away the crown impinging against the second molar. This preparation can be accomplished with but little pain and will be tolerated by the most sensitive and nervous patient. Frequent tests should be made of the tooth with elevators to detect some slight movement and giving away of its support. After thorough preparation and the tooth having been completely undermined, administer gas and extract with elevators.

While it may not be entirely germane to the subject of this

paper, if you will permit the digression, I shall point out what I consider a weak spot in the curriculum of the dental college course, viz.: the lack of systematic training in the extraction of teeth and the use of dental anesthetics.

You will agree, I am sure, when I state that this department is of the most vital importance, especially to the country practitioner, since the standard of excellence in the minds of so many patients is based on the ability of the dentist to extract teeth.

No service performed by the operator so endears him to his patients as the painless extraction of teeth. Ability in this line is the greatest practice builder known in the profession to-day. A reputation is made or lost quicker in this direction than in any other department of dentistry. The patient who is successfully relieved by means of the forceps believes the operator to be possessed of skill in all other work. Close friendships are thus formed and the patients remain lifelong and profitable enthusiasts.

Compare the teaching you have received in college in this department with any other department. If necessary to curtail any part of the course let it be in the didactic requirements. My experience in college teaching is that the student boasted at the close of his final term that he felt prepared to handle extractions and anesthetics.

How many patients and their influence have you lost in your early practice by your lack of skill as an extractor?

Nitrous oxid gas, the safest and best of all anesthetics, was seldom used during my term and the student was not taught that he should use it without fear or concern. Nevius, Hasbrook, Thomas and Colton have grown opulent through its use, and nearly 100,000 administrations by Dr. Nevius, without a single accident, gives him the world's record. (A report of interesting cases with illustrations will follow in the October number of the *Dental Digest*.—EDITOR.)

THE CONSERVATIVE PREPARATION OF LIVE TEETH FOR BRIDGE ABUTMENTS.

BY W. O. FELLMAN, D.D.S., OAK PARK, ILL.

In nearly all branches of the dental profession there have been marked steps of advancement within past years. Every year,

or even oftener, we see some particular branch of the profession springing into prominence, and shining so brightly that it fairly casts a shadow temporarily on all the other branches.

Some have come up and passed as rapidly as they came. Others have come to the front, and then fallen back a pace or two, and still others have come to the front to stay. These steps of advancement, in the line of mechanical appliances of different kinds, have taken prominent places in our operating cabinets. They were used while there for a time, then gradually pushed to the back of the drawer, and from there into the laboratory, to be finally cast out as rubbish.

The same is true of the various new methods. So many have come to the front to remain there but for a short time, then as their weak points are discovered, they gradually sink into disuse.

In the practice of dentistry, at the present time, the field for the use of different methods and appliances is very extensive. Each method has its ideal adaptation in selected cases. Some methods may be used quite universally, others only in specific cases.

The prominent men in the profession, by keeping abreast of the times, are in a position to choose from the many methods the one which is especially adapted to any given case. There is no one method in any branch of the profession that can be used universally. If the arrangement, size, color, shape and environment of the teeth were alike in all mouths, there might be some set method to be used universally, but such is not the case.

During fourteen years of experience in dentistry, seeing and repairing the ravages of caries in thousands of mouths, I have yet to see two sets of teeth exactly alike. No two cases being identical in detail, it behooves us, as dentists, to know the different methods of repairing the lost tooth structure and to be able to choose the one ideally adapted to any given case.

Now let us consider one of the newer methods of attaching bridges to vital teeth. The preparation of the incisors, cuspids and bicuspids with live pulps has been fully described by Drs. Carmichael, Bennet, Alexander and others.

The following is a new preparation of the upper molar to be used as an abutment for a bridge. The mesio-lingual and mesio-buccal cusps are ground off flat with a stone, slightly below the

level of the central pit. With a knife edge stone, cut a continuous groove linguo-occluso-buccally, about the depth of one millimeter, crossing the central pit. The distal margin of this groove must be well defined. Then taper the mesial surface from the mesio-marginal ridge to slightly below the gum line. Taper also the lingual and buccal surfaces like the mesial distally as far as the groove only. The mesial half of the molar will now have a tapered appearance, with a continuous groove on the buccal, occlusal and lingual surfaces.

An impression of the ground portion of this tooth is now taken in the following manner. With a pair of shears trim and fit a Roach impression thimble to the tooth. Fill it with heated white guttapercha, and take an impression of the ground portion. Chill it with cold water and remove from the mouth. If the impression draws imperfectly, correct the fault at once.

The next step is to reproduce the tooth in Mellotte's metal. So often it has been stated that a good model cannot be made with this metal, but with the following method excellent results can be obtained after a little experience.

Take the rubber ring which is a part of the Mellotte's outfit, fill it with soft plaster and imbed the guttapercha impression, face upward, into it ¼ inch below the surface. When plaster has set, remove the rubber ring and with a sharp knife bevel the face of the plaster from circumference to the guttapercha.

Now slip the rubber ring half way over the plaster, melt a new piece of metal and while hot pour the clear metal into the guttapercha impression and rubber ring. While the metal is still soft, apply pressure to the top of the metal by placing a piece of cardboard over the rubber ring, therewith forcing the metal into the sharp angles of the impression. Allow metal to cool slowly. This produces a clean sharp model.

Swage or burnish with orangewood sticks, 36 gauge, 24-carat gold plate, to the model, leaving a slight overlap on the margin of cavity. Bend a piece of 22-gauge iridio-platinum wire over the gold in the groove and wax it to place with Parr's wax flux.

The next step is to reburnish the inlay on the tooth in the mouth. When perfect, solder the wire to place without investing. Restore the cusps and buccal and lingual contour on inlay with

wax, and try inlay in the mouth. See that the occlusion is correct, then invest the inlay with mesial surface exposed.

Burn or boil out the wax and replace it with crystal gold, into which flow 22-carat solder. The inlay is now polished to the definite margin while on the tooth. This restores the mesial half of the molar with a gold inlay, having self-cleansing margins, a broad inner surface for cement attachment, and a broad outside soldering surface for the attachment of the lost teeth.

If the operator has any fear of the cement not holding the inlay in position, he may drill a small hole through the lingual surface of the gold and into the dentin, tap it, and insert gold screw wire.

Since the new method of casting gold has come to the front, these inlays may be cast.

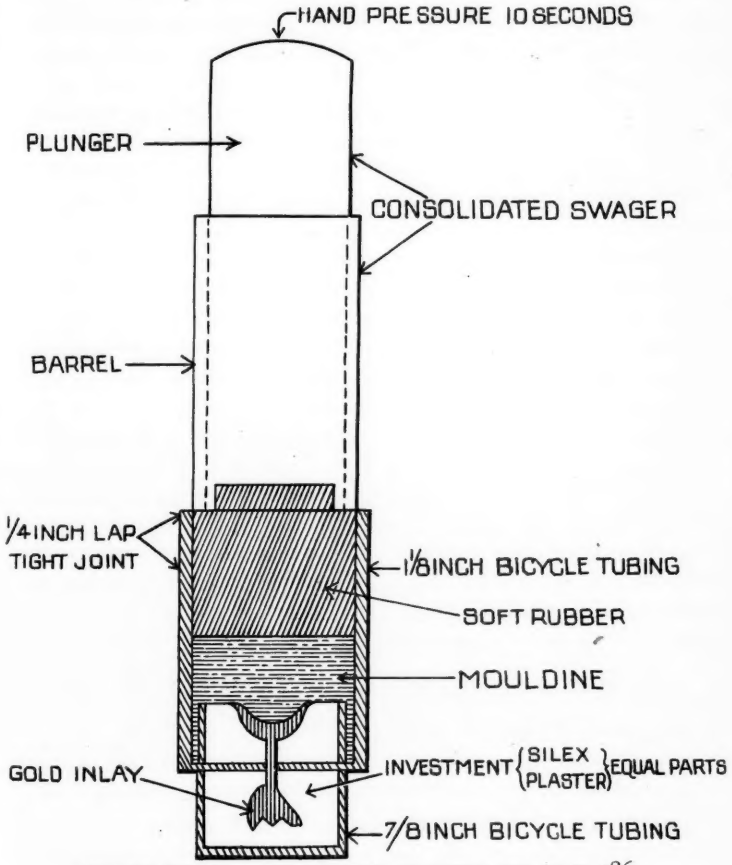
The great majority of lower molar and bicuspid bridges are made of gold alone without porcelain. Only the occluding surfaces of the lost teeth are restored in gold, with no buccal surfaces at all, thereby leaving a clear space below the bridge, which can be kept perfectly clean, causing the gum to remain firm and healthy.

Lower molars may be prepared by the same method as the upper; but when there are no other molars behind the one in question, it is prepared as follows: Grind off the occlusal surface, causing a space between the upper and lower molars, of about 1 to 2 mm. Then with a stone taper the mesial, distal, buccal and lingual surfaces of the tooth to a definite margin, leaving the gingival third of the enamel untouched. This gives the tooth a tapered appearance, with a shoulder the thickness of 30-gauge gold, to which the gold is finished. An impression is now taken with guttapercha, from which a die and counter die are made with Mellotte's metal.

Swage a pure gold cap 36 gauge. Reburnish this cap on the tooth in the mouth to the margin of the shoulder. Swage a suitable cusp of 22-carat gold, 30 gauge, and wax it in position on the cap. See that the occlusion is correct. Remove this from the tooth and invest it. Then unite the two parts and build up contour with solder.

The advantages of this abutment attachment are as follows: The pulp is preserved. The patient is spared a good deal of pain,

time and expense by not undergoing the treatment of the tooth and root filling. The gold cap fits accurately and affords a very strong attachment for lower bridges. They cause absolutely no gingival irritation, which is so often seen in lower molar crowns.



CASTING DEVICE. FOR METHOD OF USING SEE PAGE 986.

These methods have been used for several years by the writer, with entire satisfaction. They cannot, however, be used universally, but are ideal in selected cases.

Before closing I will describe briefly a method and device for casting inlays.

CASTING METHOD.

This device is simplicity itself; no compressed air is necessary. A piece of thin, steel bicycle tubing, 1½ inches long and 1⅛ inches in diameter, is forced ¼ of an inch over the barrel of the consolidated cusp swager. These two pieces must fit tightly and be stationary.

The half of the bicycle tubing nearest the plunger is filled with very soft rubber, the other half almost filled with moldine.

The casting rings, in which the wax inlay is invested, and into which the gold is forced, are ⅞ inches long and ⅞ inches in diameter.

After burning out the wax place the case on the flat side of the soldering block; melt the gold with blow pipe in left hand, and have the swaging device in right hand, resting palm against the plunger. When gold is very hot, press the moldine surface over the hot case and force down the plunger with the palm, giving it steady hand pressure for ten seconds.

Wear a canvas glove on the right hand for a protection from the heat.

This device is simple, inexpensive, and the results are absolute. It is not for sale, and the suggestions are given simply for the benefit of those who wish to make their own temporary appliances out of tubing until Dr. Taggart's perfected machine is on the market for casting inlays.

CAUSES, DIAGNOSIS AND TREATMENT OF DISEASES OF THE MAXILLARY SINUS.

BY J. P. BUCKLEY, PH.G., D.D.S. LECTURE DELIVERED TO THE SENIOR CLASS AT THE CHICAGO COLLEGE OF DENTAL SURGERY.

We want to consider at this time a condition which we are not often called upon to treat, and yet, when the case presents itself, we must know how to diagnose this particular condition and how to treat it—a disease of the maxillary sinus, often erroneously called empyema. From some cause or other the membrane lining the maxillary sinus has been irritated, the irritation has gone on

until we have a destructive generation of the cells brought about, infection occurs, and pus results. In your anatomy you will often find this cavity referred to as the antrum of Highmore.

Anatomy.—The antrum is a space, which, as you know, occupies the body of the superior maxillary on either side of the jaw. It is somewhat pyramidal in form, not unlike the shape of a pear; that is, one of the short pears, large at the bottom and somewhat of a pointed apex at the top. It is supposed to be sufficiently large to contain from two drams to sometimes one ounce of fluid.

Function.—We sometimes wonder why the maxillary sinus exists, what its functions are. It does not seem to have much of a function, and yet if we study the shape of the face we realize that by having the space in the superior maxillary bone we can have the proper contour to the cheek without the bone being abnormally large or thick, and have the bone perform the same function that it would perform if it were one solid mass of bone. There is another function which students have given to this space, and that is that it gives resonance to the voice. Without it we would be unable to speak with the same distinctness, and we know it to be a fact that when the maxillary sinus is diseased the patient has a husky voice; not the clear, resonant sound that it is possible to have when the maxillary sinus is in a healthy condition. So, while we may wonder sometimes what the function of this particular space is, we can assign some function to it.

Pathology.—There are several causes of disease of this sinus, several things are capable of producing an irritation of the membrane lining the antrum, when it becomes infected, is broken down and pus is formed.

(1) *Dental Conditions.*—We as dentists may say that the irritation producing disease of the antrum is more frequently due to conditions affecting the teeth than any other, and even rhinologists and laryngologists have been forced to realize that the antrum becomes diseased from this particular cause more frequently than from any other. They do not always like to admit this, but it is a fact. The greatest source, then, of disturbance of the antrum is diseased dental conditions and perhaps abscessed teeth.

(2) *Catarrhal Inflammation.*—The second cause of antral trouble with reference to importance is probably catarrhal inflammation.

You remember from the anatomy of the head that there is supposed to be an opening which leads from the nose into the maxillary sinus, and that the Schneiderian membrane which lines the nasal cavity passes through this small opening and the continuation of it lines the antral cavity. Sometimes this little opening which connects the nose with the antrum is occluded, but it is supposed to be there, nevertheless, it was there at one time. So if we have catarrhal inflammation of the nasal mucous membrane, this same inflammation, if it is continuous and progressive, goes on and involves the mucous membrane lining the antral cavity. Therefore, the second cause of antrum trouble with reference to importance, is probably catarrhal inflammation. Especially is this true of people in this city, living so near the lake, and of people living in other localities the climate of which is as changeable as this.

(3) *Foreign Material.*—A third cause of disease of the antrum is foreign material. Sometimes in extracting the pointed root of a tooth, if we are careless, and even when there is not carelessness on our part—it may happen when we use judgment and care—in adjusting the beaks of the forceps on either side of the root, especially if the root is badly decayed it may be forced through the thin plate of bone that stands between the root of the tooth and the antral cavity proper, into the antrum, making a foreign body in the antral cavity. Polypi are also frequently found.

(4) *Traumatism.*—Oftentimes the antrum becomes diseased because of traumatic injury, as a blow, this constituting another source of antral disease.

So here we have four sources of antral disease: The main one so far as we are concerned, and we believe the main one so far as anyone is concerned, is diseased or abscessed teeth; the second one, especially in certain localities, is inflammation of the membrane lining the nasal cavity, the continuation of which membrane lines the antral cavity; third, foreign material—growths, roots of teeth, sometimes insects,—anything that is foreign to the antral cavity, which, getting in there, will produce an irritation, is the next cause of antral disease. The fourth cause (and perhaps we ought to put this one third in importance and the third one fourth)

is traumatic injury, as a blow, crushing in the outer wall of the antrum.

Diagnosis.—It does not make any particular difference what the cause of the trouble may be (unless it is traumatic injury), the symptoms are practically all the same, and in diagnosing this condition we have to take into consideration practically the same symptoms, unless, of course, the antrum, as stated, is diseased from traumatic injury; if you saw that the patient had received a severe blow on the cheek and pus was flowing from some place about the nose or teeth, you would, without entering into the previous history of the patient, suspect that the outer wall of the antrum had been crushed in, and as a result, we have this condition. But where we have no objective symptoms, as it were, then the subjective symptoms which will clear up the diagnosis of this condition are practically all the same. Whenever we have a progressive inflammation of the membrane which lines the antral cavity, whether it is caused by an abscessed tooth or an inflamed and broken down nasal mucous membrane, and that inflammation has gone on to an extent where pus is formed and we have true suppurative sinusitis, you will find that the patient will tell you he has a peculiar, dull feeling on one or the other side of the face; there is a fullness, as the patient will express it—there seems to be a pressure against the outer surface of the antral cavity, and not infrequently there is pain, but not always; sometimes this condition exists for years, or for months at least, without the patient knowing it; there has not been enough inconvenience produced by the pressure or by this peculiar feeling to excite the interest of the patient. But frequently there is pain, and the patient comes to us because of the pain rather than the other symptoms which we have to take into consideration in trying to diagnose the condition. If this inflammatory process goes on to an extent that pus has been formed in sufficient quantity to fill the antrum (which would ordinarily be one or two drams, depending upon the size of the antrum, sometimes as much as one ounce), when the patient lies on one particular side he will find, if the opening from the nose into the antrum has not become occluded, that he has a discharge on the pillow on rising; for instance, if the antrum on the right side is diseased, and the pa-

tient lies on the left side, thus making the opening from the antral cavity into the nose somewhat dependent, upon arising he will find on the pillow a thick, syrupy, foul-smelling discharge. When a person is in the sitting or standing position the opening between the antrum and the nose is near the top of the antral cavity, and even if the cavity was full of pus or fluid it would be almost impossible for it to pass through the small opening into the nose unless some force, as sneezing or blowing the nose, was exerted. These are the symptoms, then: Pressure, sometimes pain, a feeling of fullness, and oftentimes a discharge through the nose, especially when the patient lies in a particular manner, and these patients will nearly always tell you how they have been accustomed to observe this discharge when they lie in a certain position. These symptoms aid us in diagnosing the condition.

There is one other factor we might consider which would aid somewhat in clearing up the diagnosis in some of these cases, although ordinarily we do not use it, and that is the X-ray, and the little mouth-lamp that you will have in your office will prove invaluable. By pulling down the shades and making the room as dark as possible, then placing the electric mouth-lamp on the lingual side of the teeth, raising the cheek, the tissue will be found to look more foggy on the side of the face the antrum of which is diseased, than on the other. We must not depend too much on this, however, for when there is pus in any cavity of the body, when there is a tumor or growth in the intestinal region or any other part of the body, the rays will penetrate the pus or growth almost as readily as the normal tissue. Therefore, this is not an absolutely correct and infallible means of diagnosis in such cases, as much depends on the influence of the light given off by the X-ray, and even of the electric mouth-lamp that we use. The application of the electric mouth-lamp is a beautiful way of determining whether or not a pulp is dead, but we are dealing with a more difficult problem in trying to determine by means of this electric light whether or not there is pus or a polypus in the antrum. We must take into consideration the symptoms that are usually present when we have this disease.

Prognosis.—Having satisfied ourselves as to the diagnosis, the prognosis of this condition is good if we know how to treat it.

And you can tell your patient with all the confidence in the world that you can cure that condition, but you cannot cure a disease of the antrum unless you go at it as though you meant business. If you have pus in the antral cavity which has come from an inflammation of the mucous membrane of the nose, that pus must be evacuated. But if you are going to try to evacuate it through the small opening into the nose you had better not promise that you are going to cure the disease, because you can seldom do it.

Surgical Treatment.—If there is pus, then, in the antral cavity, as there will be if any one of these irritants has been in operation for any great length of time, it is necessary for you to make an opening, if there is not already one, into the antrum. With us this is not such a difficult problem, because the antral cases that we are called upon to treat are usually those having a dental origin—those which have been produced because of diseased or abscessed teeth. It may be that there is a tooth removed on that particular side of the jaw; it may be that the tooth from which the antral cavity became involved has been abscessed so long that we decide to remove it, and in the removal of that tooth we produce an artificial opening into the antrum. Even if there are no diseased teeth, and the patient is sent to us by some medical man who believes that we have the better instruments and the better facilities to open into the antrum, even though the cause was not of purely dental origin but came perhaps from an inflammatory condition of the nasal mucous membrane—even then it is not a very great operation, it causes neither ourselves nor the patient much inconvenience to establish an artificial opening. What I want to impress upon your minds, then, is the fact that there must be a sufficient opening established in the most dependent part of the antrum, if we expect to thoroughly and completely evacuate the pus.

To intelligently treat the condition there are three things you want to do: (1) Find the cause and remove it. That does not mean that if the cause is a diseased tooth you are to remove the tooth, but simply remove the cause of the trouble in the antrum by treating the abscessed tooth. So the first thing to do in treating the antrum is to find the cause of the antral disease and remove it so far as the antrum is concerned—not necessarily remove the

tooth. (2) Evacuate the pus. (3) Establish complete drainage. Three factors that must ever be borne in mind in treating antral disease. We have found the cause of the trouble, now we are going to remove it if possible.

The way to evacuate the pus is to make an artificial opening, and I want you to remember that it is necessary, if you are going to get the best result, to establish this opening in the most dependent part of the antrum. But there is no rule by which you can do this. The most dependent part of the antral cavity is supposed to be in the region of the second bicuspid to and including the region of the second molar on either side. Barrett's Pathology tells us that the most dependent part of the antral cavity is over the second bicuspid. Dr. Marshall, surgeon of the United States Army, a man of equal authority and experience in teaching and studying these conditions as even Dr. Barrett, tells us the most dependent part of the antral cavity is over the second molar. If you will examine the skulls in an anatomic laboratory, or in our own dissecting-room, with reference to the location of the antrum and then with reference to its most dependent part, you will find that both Dr. Barrett and Dr. Marshall are right—that the location of the cavity and of the most dependent part varies in different people, and that, therefore, there is no set, definite rule by which we can open into the antrum in its most dependent part. But we can remember that ordinarily the most dependent part is in that region from and including the second bicuspid to and including the second molar.

I want you to remember one more thing in connection with the dependent part of the antrum, and that is that in all cases the most dependent part of the antrum is lingually. If you have removed, then, an upper first molar we will say which was diseased, or the upper first molar had previously been removed before the case came to you for treatment, and you want to establish an artificial opening into the antrum through one of the sockets of this three-rooted tooth, even though the sockets had been filled in, you would drill through in the region of the lingual root, although if the roots were very divergent you would not go straight up the socket, but you would start in the lingual socket rather than in the buccal socket, because from the anatomy of the head we have

learned that the most dependent part of the antrum is toward the lingual.

How are you going to establish the opening? Nearly all the oral surgeons, the ones that are used to performing more severe operations than this, would tell you that you must give your patient a general anesthetic before opening into the antrum, but it seems to me that this is seldom, if ever, necessary in view of the fact that we can use local anesthesia so successfully. If we know the strength of our local anesthetic and know how to use it in order to produce results, I repeat that it is seldom necessary to completely or generally anesthetize the patient for the purpose of establishing this opening. The only pain connected with the operation is produced in lancing the gum and establishing an opening through the soft tissue and pericemental membrane, and we can completely anesthetize the soft tissue and the pericemental membrane by means of local anesthesia. We cannot anesthetize the bone, but there is, I might say, absolutely no pain in drilling through the bone or the floor of the antral cavity.

Supposing we have extracted, or there has been recently extracted, an upper first molar, and we are going to establish the opening through the lingual root; in this case having something to guide the bur, we had better take a large round bur, larger than any bur we have in our outfit and with a long shank. But we ought to use this bur only where we have the socket of a tooth to guide the instrument, because you know that in drilling in the enamel if we start the cavity with a large round bur instead of a bur that is pointed, it will jump all over until a little pit has been made to start the bur. On the other hand, when you have a rounding surface of bone, your large round bur, when it has passed through the soft tissues and comes in contact with the bone, would jump all over the surface and destroy more periosteum than should be destroyed. We can avoid that by taking a sharp, pointed bur in those cases where we have not the socket of the root to guide the instrument. When we get through the soft tissue and the sharp bur touches the floor of the antrum, by putting just a little pressure upon the bur we can go directly through that floor without the bur having that jumping motion, as it would have if we used the round bur. But in all cases where

we can use the large round bur it is best; in fact, after we have an artificial opening established by means of the sharp or pointed bur, it is well to enlarge it by the use of a large round bur. This opening into the antrum ought to be at least the size of a lead pencil if there is nothing more than pus to be evacuated. Do not be afraid to make a good, fair-sized opening, it will heal up all right; the trouble usually is that it heals before we want it to heal.

Therapeutic Treatment.—After having done our best, then, to make this opening in the most dependent part, we want to let the pus flow, just as in opening into an abscess we let the pus flow of its own accord. Then we want to thoroughly slush out the antral cavity by means of some agent. We know the cause of the condition, we believe we can treat the case successfully, we have the opening, and now we are ready to apply our threapeutic treatment.

(1) *Evacuating Pus.*—All through the practice of dentistry too much dependence is placed upon drugs and medicines. I have told you before in connection with treating other conditions that we expect too much of drugs. If you have pus in the sac of an abscess at the end of a root, it is a thousand times better for you, and for the patient especially, if you will mechanically evacuate all of the pus that it is possible to evacuate. The same thing is true here: Instead of using pyrozone to chemically decompose the pus in the antral cavity; instead of using any strong disinfecting solution, after you have the cavity open and the evacuation has progressed as much as it will of its own accord, the first thing you want to use is some bland solution—the same as in trying to establish a sinus leading from an abscess tooth. Sometimes the agent we use could hardly be called a medicine, frequently water is a therapeutic agent. In the case of an abscess with a sinus we would not think of first using phenol, neither would we think of using pyrozone. So in the antrum we use some bland solution, something that is not irritating. Sometimes we do not have any pus in the antral cavity, only a muco-serous collection. That is a different phase of the subject. Where we have pus to be evacuated all we need to do in order to cure that case is to evacuate the pus. After we have the pus thoroughly evacuated and we

see that our case is not progressing as it should, then we can use some disinfectant, which disinfectant is not an irritant, something that will kill the micro-organisms with as little irritation to the antral cells as it is possible to use.

The agent you can use for slushing out the antral cavity is a normal salt solution—nothing is better than a weak solution of sodium chlorid in distilled water. Another thing you can use is simply distilled water alone, but usually we add that mild, non-irritating antiseptic, boric acid; make a saturated solution of boric acid in distilled water and use either this or your normal salt solution—two bland solutions that can be used for the purpose of thoroughly slushing out the antral cavity.

(2) *Establishing Drainage.*—If after you evacuate the cavity at the first sitting you dismiss the patient without taking any precaution to keep the opening patulous, by the time the patient returns the next morning, even though you have made an opening the size of a lead pencil, you will find that it is occluded in some part and it will be necessary for you to go up with a blunt steel instrument and destroy the little granulations that have taken place over night. At the first sitting, then, after making the opening and thoroughly washing out the antral cavity with this bland solution, I would pack gauze into the opening. This may seem to defeat the very object we are trying to accomplish—we are trying to establish perfect drainage until we have first established a patulous opening into the antral cavity, and I would rather retain some of the pus and some of the solution that I had used the first day or two in the antral cavity and not establish perfect drainage at once, than let it seem to drain and have to establish the opening every time the patient returned. So if you will pack gauze the first and perhaps the second time into this opening you have made to keep it open, by the second or third day, having slushed out this cavity every morning, or twice a day if necessary, you will find you have an opening that will remain open; that is, it will remain open at least two or three weeks—a sufficiently long time for you to have thoroughly disinfected the antrum.

(3) *Disinfection.*—If, however, after you have this opening established and it has remained open for two or three weeks, you find that you have more accumulation of pus than you like to have,

there is one drug that you can use to check the formation of pus about which I have told you very little this winter because it will stain teeth so readily, and that is Chinosol. There is no question but that this agent is one of the best disinfectants we have. I do not want you to use it in disinfecting a sinus from a chronic abscess; I do not want you to use it in a blind abscess, because nothing will stain a tooth so beautifully as Chinosol, and I do not believe we ought to use any agent in the tooth structure that is capable of staining that structure. But here we do not expect to use Chinosol in the tooth, we only expect the solution to completely sterilize, as it will, our infected antral cavity. You can use Chinosol notwithstanding the fact that it does not taste well —the patient will not like it, but in spite of this objection Chinosol (10 per cent solution) is one of the best disinfectants we have to use in these antral cases.

Another agent that you can use is a new preparation of silver, and that is Argyrol. This agent is recommended in 20 per cent solution, but you do not need to use it that strong; 10 per cent solution will do the same thing that the 20 per cent solution will do. The worst trouble with this preparation is that it is liable to get on the patient's clothing; it gets on your napkins the best you can do and the stain produced by it looks like iodin stain. And unless you take the precaution with your napkins to wash them out in hot water just as soon as the Argyrol gets on the linen you will have a stain that does not look well, even though the napkin or towel is clean. If you get dialyzed iron or iodin or Argyrol on a napkin, even though the rest of it is clean it does not look clean to the patient. Therefore you must be careful in using Argyrol.

You will have no difficulty in successfully treating a case of antral disease if you will observe these three precautions: Remove the cause of irritation, thoroughly evacuate by some bland solution the pus in the antrum, and establish perfect drainage. All you have to do after having the opening established is to keep slushing out the antral cavity until it is cured, the pus formation stopped.

Drainage Tube.—There is one thing more I ought to mention

in case you should read anything about treating the antrum, and that is about the use of a drainage tube. I would not use a drainage tube unless I found it to be absolutely necessary to use a tube for the purpose of keeping the artificial opening from healing. You cannot pack in this gauze every time the patient comes, that will defeat the object. If, after we pack in gauze at the first three sittings the opening does not remain open, and you cannot keep it open after that by cauterizing with silver nitrate or phenol-sulphonic acid or even phenol, then and only then would I advise you to use a drainage tube. If you cannot establish perfect drainage without the use of a drainage tube, it is absolutely necessary to use it, otherwise it is not.

Complications.—If, after you have located the cause, or the supposed cause at least, of the disturbance in the antrum and removed it, evacuated the pus or accumulated mucus, and established complete drainage, you find that the case does not progress as nicely as you believe it should, you can look for some complication. I shall refer to them but briefly.

Sometimes you will find that the antral cavity is separated into different portions by bony partitions or septa. In those cases it is necessary in establishing drainage to make the opening sufficiently large to enable you to reach in and break down those little bony septa that separate the antrum into chambers, as it were, because if you have these septa, your opening at the most dependent part, it is absolutely impossible, no matter how much you slush out with your bland solution that cavity, to remove all the accumulated mucus or pus that is present in those little chambers. So you will have to reach in with an instrument and break down those little bony partitions. In some of your works on anatomy you will find the statement that frequently the ends of the roots of the teeth extend into the antrum, and that if one of those roots becomes diseased antrum trouble will always result. That statement is incorrect—we never find the end of the root of a tooth extending into the antrum. The end of the root is always covered with bone. As you know, the cementum of the root is covered with the pericementum, and the pericementum always has bone on either side. The pericementum stands between the ce-

mentum of the root on the one hand and the alveolar process on the other. So if a root were sufficiently long to extend into the antrum of Highmore, you would have a bone still covering the end of the root. That condition we frequently find; in other words, the floor of the antrum, instead of being level as it is ordinarily, has little elevations for the purpose of accommodating the long roots. In the cases where we have those little elevations over the ends of the roots that are abnormally long it is difficult to thoroughly wash or slush out the pus or accumulated mucus.

We have another complication which is severe. The infundibulum that leads from the frontal sinus should discharge into the middle meatus of the nose. Sometimes, instead of discharging into the middle meatus, it discharges into the antrum. If, then, you had a diseased antrum that would not yield to your treatment you might suspect that you had an abscess of the frontal sinus and that the infundibulum, instead of leading to and emptying into the nose as it does normally, empties into the antrum of Highmore. In that case you could not cure the antral trouble by simply treating the antrum, because the pus does not come from the inflamed mucous membrane of the antrum, but from the cells that are broken down in the frontal sinus—an abnormality, then, in the anatomy of the individual which sometimes makes a severe complication in treating these conditions.

Then again, in treating the antral mucous membrane the gauze sometimes gets away from the operator unknowingly, or a little piece or raveling of the gauze separates from the main portion and gets into the antrum, constituting a source of irritation.

A growth in the antrum, such as a polypus, is another complication to be looked for.

Here we have several complications which we can suspect when our case does not get along as nicely as it should. It is within the province of dental surgery to treat antral disease, and every dentist should at least be familiar with the symptoms in order that he can arrive at a correct diagnosis. In cases of doubt, it is his privilege and duty to consult with the rhinologist or stomatologist as to the best method of treatment in a given case.

Digests.

PORCELAIN INLAYS. By Dr. Finnis E. Roach, Chicago, Ill. The rapid development and high state of perfection of the porcelain inlay of to-day would seem to warrant the ever-increasing confidence in its permanence, and its near approach to the ideal places it in the front rank as a filling material for a certain class of cavities.

While possessing at present an inherent friability which precludes it from first place in cavities exposed to masticatory forces, it will, however, prove eminently satisfactory when properly inserted in judiciously chosen cavities. The practitioner who fails to avail himself of the use of this new filling material is doing himself and his patients an injustice. He not only deprives his patients of the benefit of one of our most valuable aids in tooth restoration and preservation, but he likewise deprives himself of a really pleasant and profitable part of dentistry.

To attain any degree of success in this line of work, it is imperative that each step be taken with precision and a careful observation of minor and seemingly insignificant details.

In consideration of this subject the author purposely avoids the discussion of the various methods, believing that a brief, concise presentation of the method, which is generally conceded to be the most practical, will best serve the purpose of this paper, and hence high-fusing porcelain only will be considered.

INDICATIONS.

In a broad sense porcelain may be indicated in any conspicuously located cavity, where sufficient bulk of material and secure anchorage is obtainable. More specifically porcelain is indicated: First—In conspicuously located cavities for esthetic reasons. Second—For teeth lacking in structural strength, porcelain will render the most permanent service. Third—When the nervous strain, incident to proper condensation of gold, is to be avoided. Fourth—In teeth loosened by disease or otherwise incapacitated to endure gold filling.

The indications for porcelain are given in the order of their favor for the respective localities named, viz.: 1st, Labial. 2nd, Labio-gingival. 3rd, Proximal cavities in incisors and cuspids.

4th, Buccal. 5th, Incisal. 6th, Proximo-incisal. 7th, Occlusal. 8th, Mesio-proximo-occlusal. 9th, Disto-proximo-occlusal.

Labial inlays are first in favor because of their conspicuous location, simple construction and freedom from masticatory forces.

Labio-gingival inlays occupy the same position regarding stress, but being less conspicuous and more difficult of construction, are given second place.

Proximal inlays in incisors and cuspids are among the most conspicuous and are free from stress, but being still more difficult of construction, are given third place.

Buccal inlays for cavities (except second and third molars) are not difficult to make and are free from stress, but owing to their inconspicuous location are fourth in favor.

Incisal restorations, while hazardous risks in some cases, are usually justifiable for esthetic reasons and are placed fifth in favor.

Proximo-incisal restorations are quite as conspicuous and hazardous and, being more difficult, are given sixth place.

Occlusal inlays, being inconspicuous and hazardous, are given seventh place.

Mesio-proximo-occlusal restorations are in many cases very conspicuous and justifiable, but are given eighth place, being extra hazardous risks.

Disto-proximo-occlusal restorations, being inconspicuous, extra hazardous and difficult to make, are seldom permissible and occupy ninth and last place on the list.

Second, we have classification of cavities with reference to their requirements for retention as follows:

First—Cavities in which frictional resistance affords sufficient retention, namely: labial, buccal, simple occlusal and proximal cavities.

Second—Cavities in which direct planes of resistance are required. Namely: proximal cavities that include incisal and occlusal angles, the walls of which are sufficiently strong to afford adequate means of retention.

Third—Cavities in which some form of pin anchorage is necessary. In this class we may include all large restorations.

CAVITY PREPARATION.

The preparation of cavities for the reception of the various

filling materials demands a slight modification to suit certain characteristic features peculiar to each material, and while the preparation for the porcelain inlay is somewhat different to that of gold and amalgam, the fundamental principles apply to all alike. Namely: free access, extension for prevention, secure seating and anchorage, definite margins and so forth.

After breaking down frail walls and removing all decay, use a cross-cut fissure bur and with a sweeping motion straighten the walls. When the general outline is satisfactory, should there still remain undercuts, they should be filled with cement, after which the entire surface should be gone over and thoroughly smoothed so that no obstruction will be left to interfere with drawing the matrix. This is best accomplished with the diamond fissure bur or a similarly shaped gem or Arkansas stone.

The following rules should be observed in all cavity preparations:

1st. Obtain free access.

2nd. Cavity walls should slightly diverge from base to orifice in the direction the matrix is to be drawn.

3rd. The margins must be sharp and well defined and *not beveled.*

4th. Avoid all undercuts.

5th. The general outline of the cavity should be free from sharp angles.

6th. Cavity must be so shaped that some form of anchorage will supplement cement adhesion.

First—*Free access*—matrix cannot be properly burnished and drawn nor the inlay inserted, unless free access is obtained.

Second—*Diverging walls*—facilitate removal of matrix and insure a better fitting inlay.

Third—*Margins*—must be definite in order to get good joints and continuity of inlay with tooth. The bevel will yield an inlay with a feather-edge, which is always an element of weakness and must be avoided.

Fourth—*Undercuts*—it is impossible to draw a matrix where undercuts exist. Cut them out or fill with cement.

Fifth—*Sharp angles*—while it is not impossible to produce sharp angles in porcelain, it is easier and more artistic if the gen-

eral outline of the cavity is straight lines merged with rounded corners.

Sixth—*Anchorage*—all inlays must have one or more of the following means of anchorage supplementing that of cement adhesion; either positive or frictional planes of resistance or some form of pin anchorage. By positive planes of resistance we mean the self-retention form of cavity such as the dovetail or its equivalent. The straight mortise joint or the builder's lap of the brick serve as an example of frictional resistance for anchorage. By pin anchorage we mean baking a pin into the inlay to correspond with a hole drilled in the tooth, into which the pin is cemented for anchorage.

SECURING MATRIX.

Having the cavity properly prepared, the next step is to secure a matrix, which shall be an exact impression of the cavity to be filled.

Platinum foil 1:1000 of an inch in thickness and thoroughly annealed is most suitable. The piece to be used should be cut sufficiently large so that when burnished into the cavity, it will overlap the margins about one-sixteenth of an inch. Place the piece of foil over the cavity and with a large pellet of moist cotton or spunk that will fill the cavity when rolled tight and held with pliers, gradually force the foil into the cavity and continue packing until well fitted to walls and floor. Should the foil be slightly torn at the bottom of the cavity, it will not interfere with the fit of the inlay, as the body will bridge the space when packing. If, however, the tear should be a large one, it may be easily remedied by burnishing another piece over the floor and permitting it to extend up against the walls far enough to maintain its position until body is packed and baked.

While the matrix is held securely in the cavity with the tightly-packed cotton, the overlap should be pressed down into contact with all adjacent surfaces of the tooth. The cotton should now be removed and the marginal wrinkles all burnished out. For this purpose the author has designated a special set of instruments. The set consists of eight hand burnishers, and a double-end teaser.

The three hand margin burnishers are adapted to meet the requirement in all cases.

No. 1 represents the universal burnisher which can be used successfully on all margins except cervical and some approximal margins in molars and bicuspids and for these surfaces Nos. 2 and 3 will be found well adapted. No. 2 is to be used on distal and No. 3 on mesial cavities. The oval end should be brought to bear on the inner marginal surface, and the flat projecting wing upon the outer surface. Nos. 3 and 4 are used in adapting the matrix to the floor and walls of cavity prior to the use of margin burnishers.

As an aid in burnishing in labial, buccal and occlusal cavities, a small, stiff, curved instrument may be used to hold the matrix while burnishing. It should be laid across the cavity and held in contact with two points on the matrix on the side of the cavity opposite that which is being burnished. This affords a secure means of holding the matrix in place and does not obstruct the view.

In proximal cavities the dental floss will answer the same purpose and when tied permits the use of both hands, while burnishing margins.

In removing the matrix, if there is any suspicion that it has been distorted, return to cavity and refit. If matrix draws with difficulty, the trouble is most likely caused by undercuts or excessive overlap on side of cavity opposite that from which matrix is being drawn. Correct the trouble by eliminating undercuts and trimming matrix close to margin.

In simple cavities, the burnishing may be completed and the inlay baked to completion with reasonable accuracy. But in the more complicated cavities, the surer method is to burnish the matrix after the first and sometimes the second bake.

SELECTING AND PLACING COLORS.

With the shade guide accompanying the body being used while tooth is moist—select and make note of the color for the inlay in hand. No set rule will apply to this part of the work. Experience must be the teacher. Usually the following rule will obtain: Dark yellow or brown cervically, lighter yellows and grays toward the middle and bending out in incisal with light grays and blues.

In carrying out the color scheme five things must be taken into account as factors modifying the color, viz.: thickness of layer, proper bake, the cement, the shadow problem, and underlying

color. The thicker the layer, the darker the color, and *vice versa.* A proper bake is essential, as an underbake will not bring out the correct color, and an overbake will bleach and thereby produce a lighter color—the cement will in most cases darken the inlay and the shadow, while not affecting all inlays, will invariably darken those placed in proximal cavities of the anterior teeth. The underlying color will, of course, affect the selection of enamels.

MANIPULATION OF BODY.

Absolute cleanliness must be observed throughout the entire operation. Especial care should be taken to avoid the contamination of mineral substances and metallic oxids, such as coal dust, rust from steel instruments and the like. Another precaution to be taken is to burn off, by holding the matrix in the bunsen flame, any foreign matter, such as saliva, blood or small particles of food that may have become attached while burnishing in the mouth, before building in the body. The necessary equipment for this part of the work consists of a glass slab of liberal size, a mixing spatula, carving instrument and locking tweezers, two camels' hair brushes, a pipette, some pieces of white blotting paper and cottonoid or linen cloth.

A drop or two of water should be placed upon the slab and sufficient powder incorporated to make a stiff putty-like mixture, and after thoroughly mixing—not rubbing—the body is ready to be placed and packed into the matrix. The body should be picked up with a flat, pointed instrument (the carver serves the purpose well), or with a small camels' hair brush; and as each bit is placed it should be well packed by tapping the holding tweezers. To hasten drying, the moisture should be taken up with small pieces of blotting paper. Before making each bake, make a close examination of the matrix to see that none of the body has gotten on cavity side, as the slightest amount will very materially interfere with refitting in the event of a second burnishing, or in the final adjustment for observation of contour and color. Any particles of body that may escape through a torn place in the matrix or elsewhere must be carefully and thoroughly removed with the camels' hair brush before baking.

The first bake or foundation is usually made of one color and as it is always within the matrix walls there is no difficulty in

placing and packing, but when we come to contour work, the building becomes more complicated. We are then handling two or more colors, and while we are placing these in their respective places with reference to blend and harmony we must at the same time restore the natural contour. To get the proper blend where several colors are to be used and baked as one layer it is best done by placing the cervical portion first, and before it dries place the next color so that it overlaps the first and by a few taps on the holding tweezers, they will run together just enough to properly blend them, and so on until all the colors of that layer are placed.

In building contour it will usually be necessary to build considerable excess and carve to desired form, retaining sufficient excess to allow for shrinkage in baking.

If the inlay be for a small, simple cavity, two bakes will usually suffice; and in such cases the matrix should be filled quite to the margins, with a foundation body as near the color of the tooth as possible, and, given the first bake, after which the second or enamel layer should be built up just a little full to allow for the shrinkage. In building the more complex inlays, three or more bakes will be required.

The first and second bakes in large inlays will show very considerable shrinkage, leaving deep fissures, which, unless thoroughly filled when the next layer is placed, will be the source of an imperfect inlay. To facilitate packing body into the fissures place a drop of water in matrix and blow off excess, after which a bit of body may be placed and by a few taps settled into the most remote crevices. Packing a thick paste of body in a dry matrix is very liable to bridge the cracks.

BAKING.

Since the bodies furnished by the different manufacturers vary materially in fusibility, likewise the heat produced by the different furnaces, it is impossible to bake by any set rule. The bake, like that of harmonizing the color, can be learned only by actual experience. It matters not how expert you may be with a certain body baked continuously in a certain furnace, you cannot take up some strange body and furnace and accomplish good results at first. You must, by repeated tests, become familiar with your material and appliances. Ascertain by repeated bakings the exact

time required to produce a perfect vitrification of the body you are using. By the gold test is meant the placing of a pellet of gold in the furnace with the piece to be baked and continuing the heat a certain length of time after the gold melts. The body to be baked should always be placed in the center of the furnace and the pellet of gold in the same relative position each time. While this may seem to be a trivial matter, it is an important factor in the uniformity of your bake. An overbake, which is always irreparable, may often be the result of a failure to observe this apparently insignificant precaution. The heat being so much more intense at the center of muffle than either end, and especially near the door, it is obviously important that the position of the body and gold in the furnace be at all times relatively the same.

After the first bake and the matrix has been reburnished around the margins, should the inlay be one of considerable size, it is well to place a second layer of foundation body and draw a thin layer of same well up to all margins. This will form a thin film of higher fusing material along the margins and will prevent the enamel layer from drawing away from this surface, where it is so desirable to have perfect adaptation.

In placing the last layer the body should be built up in excess of the desired contour to allow for shrinkage and all overlapping body should be trimmed off to the margins. Otherwise the feather-edge thus formed is very liable to break off when the matrix is being removed, and should the break occur outwardly, the margin of the inlay will surely be injured.

OVERCOMING WARPAGE.

To overcome the warpage incident to baking large inlays for cavities having parallel walls perpendicular or at right angles to the floor of the cavity, a small sliver of some old porcelain tooth should be ground to fit into matrix so that it will rest at both ends against the walls. The body may be packed around this piece and the inlay completed with little danger of warpage.

PRECAUTIONARY ADJUSTMENT.

After the final bake the inlay should be tried to place in the mouth and observations made as to contour, color, etc., before the matrix is removed. Should the inlay be an approximal one, and by reason of excessive contour require grinding, it is best to do so

before matrix is removed, in order that it may be returned to the furnace and the surface glaze restored. If it is found desirable to grind the surface after the matrix is removed, the surface may be very satisfactory polished with paper disks and tin oxid polishing paste carried upon an orangewood point in the engine. Grinding will seldom be necessary if the proper care is observed in the work up to this point.

It is always desirable to have the glazed surface on proximal inlays, especially where the contact is with a natural tooth. The self-cleansing surface of a highly-glazed porcelain inlay insures a degree of immunity to caries of the approximating tooth, not to be obtained with any other filling material now in use.

STRIPPING MATRIX.

In removing the matrix from the inlay, it should be pulled back away from the margins all around and then by grasping with pliers and rolling upon the point it will usually peel off easily. Should any small pieces of the matrix remain attached to the inlay they may be easily removed with an old bur or a fine-pointed instrument.

All over-lap feather-edge margins must now be trimmed off, and this is best done with a small engine stone rotating along with the edge instead of across, as the latter method is more likely to break the edges, and as the break almost invariably leaves an imperfect margin on the inlay, it should be at all time guarded against.

ETCHING AND CEMENTATION.

To afford a means of attachment for the cement the cavity surface of the inlay should be roughened or grooved. In large inlays this may be successfully done with small knife-edged stones, but in the majority of cases better results will be obtained by etching with hydrofluoric acid. The etching is best accomplished by warming the surface of a piece of paraffin or beeswax and burying the inlay, leaving only the cavity surface exposed, to which a drop of the acid may be applied for five or six minutes, after which the surface should be thoroughly cleansed with a stiff brush before removing from the paraffin. After removal from the paraffin it should be dipped in alcohol or chloroform and dried. The cavity should also be wiped out with alcohol or chloroform and kept thoroughly dry until inlay is cemented to place. After cementation it

will be necessary to maintain dryness for a considerable time, and as a means of expediency and comfort to the patient the cement may be protected from moisture by covering with a thin coating of paraffin or sandarac varnish.

In proximal cavities where it is difficult to exert uniform force in setting the inlay, the thin strips of celluloid previously referred to will serve admirably. The strips are exceedingly thin and strong and their transparency permits a good observation of the inlay all the time, which is an aid in determining when it is in place. The cement should be mixed to about the same consistency required in crown work.

FINISHING.

When the cement has become thoroughly hard and the excess has been removed the margins should be carefully examined to see if perfect continuity of inlay and cavity margins exists, and if the occlusion is correct. As previously mentioned grinding off the glazed surface of the inlay should be avoided as much as possible, but it is sometimes necessary, and when the stone or disk is to be used on the margins there is less liability of slivering the margins if the stone is revolved inlayward instead of toothward. After the required grinding is done the surface should be polished as indicated above.—*Dental Practice.*

EXTENSIVE GOLD INLAYS AND THEIR APPLICATION TO BRIDGE WORK. By Joseph W. Wassall, M.D., D.D.S., Chicago, Ill. That the conventional method of making artificial crowns with bands telescoping over roots or broken-down teeth is unsound practice has long been recognized by both the profession and the laity. While under favorable conditions good and safe results are obtainable, insufficiency of coaptation of band-edge and tooth-cervix is of such frequent occurrence that it constitutes a serious defect and calls for a change of method. It is a fault observed in the application of crowns to restore lost dental tissue as well as in their employment for bridge abutments.

The normal anatomic formation of bicuspids and molars (see Figs. 1 and 2) constitutes a natural and most serious bar to the perfect fitting of a band. An examination of typical tooth-forms

gives instant conviction of the irrationality and impossibility of attempting accurate and scientific coaptation at the tooth's neck, at once the most important and vulnerable point. It is all too evident that an almost universal custom of procedure is based on wrong mechanical principles, and produces unhygienic, unsanitary and disease-engendering conditions.

Flagrant violations of all the laws of dental hygiene and mechanics constantly come into our hands as crown work. Not one of us but can recall specimens which one has had occasion to remove—specimens which bring the blush of shame for the inefficiency, to use a mild term of the profession—and the worst offenders are not always men unknown to fame. It is a rare thing, indeed, to find a shell or banded crown with a perfectly fitted joint. This, it is plain, is not so much the fault of the man as of the method. The reasons therefor depend upon the very nature of the anatomic characteristics of the supporting teeth.

What is the history of the shell or banded crown—used either as a crown or abutment? As I have before said, some portion of its border stands away from the cervix (Fig. 3)—a condition usually impossible to avoid. The gum in that region is subject to irritation both from the sharp metallic edge and the decomposing débris lodged beneath it. The free gum margin will therefore be irritated; it will become more or less congested, presenting inflammatory conditions varying in intensity from slight redness to severe and dangerous purulent pyorrheal inflammation. The effects of such condition may be tenderness or positive pain, tendency to hemorrhage, true pyorrhea, formation of pockets, occasional abscess, etc. In many cases caries of the cervix, crown or root supervenes, encouraged both by the lodgment of débris in the overhang or in the cul-de-sac formed by the disintegration of the cement from beneath the band. Pain in the pulp, with neuralgia, may now be a complication. The situation is aggravated by a growing reluctance to the use of the brush, or dis-use of the teeth in mastication, followed by a constant increase in severity of all the malign conditions above enumerated. If the progress of such influences be not checked, the tooth is greatly impaired or lost, either from caries or pyorrhea, or both. This is the true clinical picture presented by a severe case, and unfortunately it

is not an uncommon experience. Does not a practice which brings forth such evil results cry out for remedy?

The substitute I have to offer for the old method is a crown inset into the substance of the tooth, the gold margin of the crown being flush with the tooth's surface.

The method recommended has been in use in my office as routine practice for some time, and is a development and outgrowth of the swaged gold inlay method of tooth-filling, being a

FIG. 1. FIG. 3. FIG. 2.

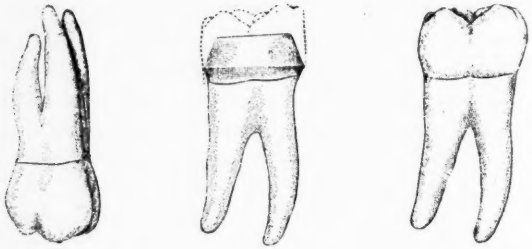


FIG. 4. FIG. 5. FIG. 6.

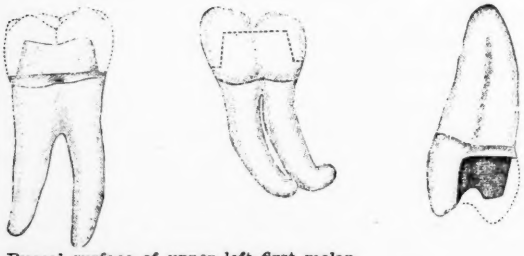


Fig. 1. Buccal surface of upper left first molar.
Fig. 2. Lingual surface of lower left first molar.
Fig. 3. Diagram showing space between band and tooth.
Fig. 4. Lingual surface of lower left first molar showing shoulder for flush-joint crown.
Fig. 5. Lingual surface of lower left second molar showing preparation of tooth-crown.
Fig. 6. Mesial surface of upper right second bicuspid showing preparation for partial flush-joint crown.

more extended application of gold inlay work. Such a covering seems to furnish a tenaciously adhering attachment, even when the natural tooth is much wasted and broken down by caries. Indeed, it is a constant surprise how securely such a covering seats itself and is retained.

There is no longer any necessity for extending the margin of

the crown beneath the gum margin of bicuspids and molars. This alone is a great gain, *i. e.*, to the permanence of the operation, as a promoter of hygiene of the mouth, comfort to the patient during the operative procedures, and ease to the operator. The new crown is in reality an "inlaid" crown, so far as its marginal coaptation is concerned. The continuity between tooth-surface and gold crown (Figs. 4 and 5), *i. e.* the gold being flush with the tooth-surface without any overlapping gold band, is the ideal condition in all tooth-crowns. This is the essential feature of the method. It should be understood that there is also perfect coaptation of the metal portion of the crown to the tooth over all covered surface.

A great advantage in the method is the opportunity it affords of avoiding destruction of sound tissue. It enables one to construct a partial crown (Fig. 6) to restore teeth which are much broken down, by allowing the inlaid crown to embrace two or three sides of the tooth only; whereas by the old method, the whole tooth being covered, greater tissue sacrifice is required. This kind of crown is particularly useful as a bridge abutment.

It may be described under two separate processes: First, the preparation or shaping of the tooth with the taking of impressions; second, the making of the crown from the impressions in the laboratory. The ultimate setting of the crown needs no description.

In the preparation of the tooth we have to deal with two classes of cases; viz., the tooth which requires a crown for its own conservation which, of course, presents a tooth greatly impaired by caries, and the case of a molar or bicuspid which is to be covered in order to serve as a bridge abutment. In the latter case we will assume for the sake of description that the tooth is perfect, but this is rarely the fact, for usually fillings more or less extensive are present, which simplify the work.

In the mouths of patients highly susceptible to pain, very sensitive teeth may have their pulps removed. This, however, is permissible only in matured teeth. Such devitalization is in actual practice rarely required, although it is quite justifiable when indicated.

As the crown is to be made entirely in the laboratory from im-

pressions, the preparations should proceed with the end in view that an impression is to be taken. The tooth is first shortened by removing one-third of its occlusal end by means of engine stones. Thin disks held in the straight handpiece are then employed to remove the mesial and distal surfaces of the tooth and similar disks and saucer-shaped stones in a right-angle handpiece are used to reduce the buccal and lingual surfaces, as well as the remaining sharp angles. A sharp shoulder approximately one line in width is left at or near the cervix, preferably just short of it, and against this the finished crown is to be adapted flush with the tooth-substance. All sides are to be well beveled or converged to the occlusal end. In cases where extensive loss of tissue has already occurred, the judgment of the operator will retain and properly shape the remaining portions along the lines above set forth. It should be remembered, however, that an astonishing degree of retentive power exists in even slight projections, depressions and irregularities of surface when exactly and closely covered by an accurately fitting cope in the manner to be described later.

If, however, there is presumed to be insufficient anchorage, provision for from one to three posts in the canals may now be provided for.

The application of this method to bridge attachment when a sound tooth is to be utilized is as follows (the description will be of a molar case, but it applies, of course, to incisors, cuspids, and bicuspids): The entire buccal portion, including the buccal cusps, is preserved. The shortening of the occlusal surfaces is confined to its lingual half, including the lingual cusps. This surface is ground down to a step at right angles to the long axis of the tooth. With a thin, half-inch wheel a groove is ground mesio-distally in the center of the occlusal surface and one line in depth. This groove is now extended over on to both the mesial and distal surfaces to almost the cervix by means of fissure burs. Let the lingual surface now be ground away, leaving the well-defined shoulder before described near the cervix, and be further extended on to both the mesial and distal surfaces up to the grooves which were previously made there. We now have a result, as shown by Fig. 6, which furnishes a mechanically perfect attachment free from the objectionable features of the old method

of making the so-called 'faced crown" with overlapping and overhanging edges both under the gum and on the approximal surfaces.

The next step is the taking of impressions. First, we take an ordinary bite in S. S. W. modeling composition, which is to serve as a guide to occlusion. Second, an impression is taken of the prepared tooth and of the adjoining teeth on each side, with modeling composition in a small tray, to serve as a guide in reproducing contour. Third, an accurate impression in Detroit "Perfection" modeling compound is taken of the entire prepared tooth, from which the model is obtained upon which to make the cope.

The occlusion and contour impressions are obtained in the usual simple manner. The impression for the cast of the prepared tooth must, however, be true and accurate, which is not a difficult matter. An impression cup is made of a copper band very loosely fitted to the tooth to be crowned, the edge being trimmed to conform to the alveolar border. The copper band is made one-quarter of an inch longer than the projecting tooth-crown, and is filled with softened Detroit modeling compound and pressed over the tooth-crown until the edge of the copper ring reaches the gum. It is chilled with cold water and removed, when, if properly done, a sharp impression of the entire crown, showing the shoulder well defined, will be the result.

The three impressions now go into a box which bears on the cover the patient's name and the date of the next appointment. This goes to the laboratory and is there completed, the patient not being seen again until the cope is to be set or to be used for a bridge abutment. It will be evident that much time and inconvenience is saved to the patient by not having the matrix conformed directly to the prepared tooth. The operator also, if a busy man, may delegate this work to laboratory assistants, or do it himself at his greater leisure.

The Detroit "Perfection compound" impression is invested in a pad of soft plaster, which is trimmed, when partly hard, to a square measuring about one and one-half inches. The redundant compound and plaster is trimmed away so as to more clearly show the margins to which the crown is to come. The trimmed

impression and plaster are rubbed with pure talcum powder, blowing out the surplus.

Ames' brown crown and bridge cement is slowly and thoroughly mixed to the same consistence as for a filling. The soft putty-like mass of cement is rolled in talcum and pressed over the impression, using sufficient force to make it conform to all the inequalities, thus making a strong, perfect cast or model of the original. The cement-covered impression is submerged in cold water and left to thoroughly harden, which requires about twenty minutes. To separate the compound impression and cement cast it is well to submerge them for a few minutes in hot water, when a knife will very easily pry them apart. The cement cast just obtained is invested with plaster in a steel cup called a bedplate—a part of the Brewster inlay swaging outfit—the surplus plaster when hard being trimmed off flush with the edge of the bedplate; a small piece of wet cotton is placed on the cement cast, to remain in place at least an hour. This is done to satisfy the crystallization requirements of an hydraulic cement, and thereby obtain the maximum strength for the cast, which with ordinary care in working is quite sufficient to withstand the force necessary to get accurate and certain results.

Either platinum foil 1-1,000 inch or gold foil No. 120 may be used for the matrix. I prefer to use the platinum foil, partly swaging it to place on the cast, using cotton held in a pair of foil-carriers. With the cotton in place, the bedplate and foil are placed in the screw-press waterbag and partly swaged to place. The foil is annealed perfectly under a blowpipe and swaged, this time without using cotton, the untrimmed foil being again annealed and temporarily put aside. A piece of well-annealed virgin platinum plate of No. 38 gage is swaged and adapted over the same cement cast—one here being particularly careful to have the metal slightly overlap the line the flush or inlaid crown is to cover. The partly swaged foil is again placed on the cement cast and is finally swaged to place, after which the adapted and trimmed platinum plate is put over the foil and both are swaged.

Both foil and plate are removed and are flushed in between with 22-k. gold solder, the surplus foil being trimmed off. This leaves a perfectly adapted metal cope sufficiently stiffened and rigid to handle in taking the bite for use in building-on a tip of accurate

occlusion and contour. This cope will be a perfect fit—providing, of course, that everything has been done according to the laws of mechanics.

The bite which is taken is poured in plaster, separated, and trimmed; a small piece of softened modeling compound is molded over the metal cope, and the bite is pressed into it in order to obtain the occlusion, the characteristic grooves, fissures, and cusps being finally carved in the modeling composition tip. A Mellotte's metal die and counter-die are made from the carved tip, and a gold tip is swaged between them, waxed to the cope, invested, and soldered with 20-k. gold solder, which allows for any patching with 18-k. gold solder that may be necessary. The polishing is done in the usual way except for the margins, which are worked down with a fine file to prevent polishing beyond the finished line. Rapidly revolving stones are much more uncertain and harder to control.

To the writer's mind the method herein suggested of having a well-defined shoulder in the coronal portion of the tooth near the gingiva, but not beneath it, into which the metal covering is inlaid flush with the enamel surface, makes for greater accuracy and permanence, and if generally adopted will mark an advance in the practice of dental surgery.—*Dental Cosmos.*

A CONSIDERATION OF GENERAL THERAPEUTICS AS APPLIED TO DENTISTRY.—By J. P. Buckley, Ph.G., D.D.S., Chicago, Ill. In calling your attention to a few drugs and medicines, and the combination of the same, which I have found useful in the practice of dentistry, I want to emphasize the pharmacy involved in the combination of these drugs, as well as their dental application.

The first prescription that you will notice on this line is one that is used for sensitive dentin.

℞ Menthol .....gr. xx
Etheris .....f℥ ss
Chloroformi .....f℥ jss—M

Sig.—Use as directed.

Now, this prescription, which contains menthol, ether and chloroform, you will find in some cases, especially large cavities where you have sensitive dentin, that you get excellent results from it. This

is not a remedy that you can use with gratifying results in all cases. I wish I had a remedy that I could give to you which you could seal within the tooth, or apply by some means, which would so obtund the dentin that you could prepare your cavity painlessly, without having the remedy act deleteriously upon the pulp. I am optimistic enough to believe that some one in the dental profession in the next few years will be able to give us such a remedy. At present I know of none. I know dentin can be obtunded by means of cocain and pressure. I mean a remedy here that can be used for the purpose of obtunding sensitive dentin without acting deleteriously upon the pulp. This remedy depends for its action upon the volatility of the liquids in the preparation, ether and chloroform. No solid can turn to a liquid, or a liquid to a gas, without abstracting a certain amount of heat from the thing to which it is applied. That is a law in physics. If you will dip a pledget of cotton in this solution and apply it before you have the rubber dam adjusted, or after, and go on getting out your instruments ready to break down the enamel and prepare the cavity, by the time you have the instruments ready the heat of the body will be sufficient to have volatilized the ether and chloroform in the remedy, and as those are volatilized a certain amount of heat is abstracted from the tooth, and the menthol is therefore driven a considerable distance into the dentin.

Now, I don't know whether you have all discarded arsenic or not. I believe arsenic has served us too well and too long to throw it away altogether. I presume most of you are removing pulps by means of cocain and pressure; but if any of you are using arsenic because you haven't time to obtund the pulp and remove it by the newer method, or because of inaccessibility of the cavity, if you use arsenic for any purpose you will find the second prescription an excellent one for an arsenical paste.

℞ Arseni trioxidi .....ʒ j
Cocainæ hydrochloridi.....gr. xx
Menthol .....gr. v
Lanolini, q. s. to make a stiff paste.

M. Sig.—Use the desired quantity.

Note—It is best to add lamp black to color preparation.

The latest revision of the pharmacopœia calls arsenic "arsenous trioxid." It has always spoken of the oxid, calling it arsenous acid. You will never see correctly written in a prescription, from

now on, arsenous acid. You will find in this prescription arsenous oxid, or trioxid, cocain hydrochlorid, menthol and lanolin. You will hear, all through what I have to say, a good deal about menthol and drugs analogous to it. The action of this arsenical paste depends a great deal on the manner in which it is prepared. If you get in too much lanolin it will not act well. The idea you want to suggest to your pharmacist is this: The use of as small an amount of lanolin as possible to make a good paste out of the three powders. Menthol is a highly deliquescent substance, and there will be enough water in the menthol crystals to make almost a thin liquid out of the lanolin. That being true, you can make a paste out of the cocain hydrochlorid, a powder, and the arsenous trioxid, a white powder, by using very little lanolin. Menthol is added to that prescription largely for pharmacal reasons. Cocain, as you know, is a local anesthetic. There is absolutely no use of putting morphin, in any form, in an arsenical preparation, because pharmacologists have demonstrated that morphin has no local action whatever. To get the action of morphin you must get it into the circulation and carry it to the brain, where it acts upon the central nervous system. While menthol has local anesthetic properties, it is not added to the arsenical paste because of that fact, as I have explained.

The next prescription is one which I have been using for some time.

℞ Menthol .....ʒ jss
Thymol .....ʒ ijss
Phenolis .....ʒ j—M

Sig.—Use as directed.

I am glad to say, too, that this same pharmacopœia, which was revised in 1900, but the deliberations of which were only published last September, recognizes carbolic acid as phenol. It has never been an acid. It has only one property of an acid, and that is that with some metals it will form a carbolate. It is recognized now as phenol. This third prescription is thymol, menthol and phenol, added in various proportions. You do not need to be extra particular in getting these drugs in exactly the same proportion in order to have them act. There is somewhere a happy medium, it is true, but the addition or subtraction of a few grains, either way, will not destroy the efficacy of the remedy. I call your attention to that, because so many of these firms who are sending to our offices proprietary medicines are

trying to make us believe they worked for months and years experimenting with these drugs and medicines, and finally, by some means known only to themselves, they happened to get a mixture which acts just so. There is absolutely nothing in it. This remedy you will find you can use as an anodyne in the roots of teeth from which you have removed the pulp, previous to filling the root, the pulp having been removed either by arsenic or cocain. I do not know whether it has been your experience or not, but it is mine, that I have had more pericementitis following the removal of pulps by cocain and pressure than I did when I used arsenic. There are reasons for that, which I cannot take the time to go into now. But anyway, when you remove a pulp, either by means of arsenic or cocain, you have irritated more or less the tissue at the apical space, and you need an anodyne there. Phenol is not bad of itself, but much the best preparation is thymol, menthol and phenol. Thymol has been recognized by pharmacologists as having a peculiar action on animal tissue. They do not know just what it is, but it produces a good effect. That is the reason thymol is put into mummifying pastes.

The constituents of this preparation are penetrating drugs, and care must be taken to use only a small quantity. If asepsis has been maintained in removing the pulp, all that is necessary is to place dry cotton in the canal and a small pledget dipped into this remedy into the pulp chamber.

The next prescription is one suggested in the last issue of the *Cosmos*. It is phenol and thymol.

℞ Phenolis
Thymol .....aa ʒ j—M

Sig.—Use as required.

Dr. Kirk has suggested the heating of the crystals of phenol, and when hot adding an equal amount of thymol. He recommends that in the same place as I recommend No. 3.

I do not know what this audience has been filling the roots of teeth with, but gutta-percha has served me well as a root canal filling; and if you use gutta-percha as a root canal filling it is well to moisten the sides of the canal, after it has been desiccated, as well as you can, with eucalyptol, or some other preparation, which is slightly solvent for the gutta-percha, making the gutta-percha hug the side of the root, and go to place without curling up and coming back. I am speaking of the gutta-percha point. Eucalyptol is a constituent

of oil of eucalyptus, and if any of you have used oil of eucalyptus as bought from the ordinary pharmacy, you have had a case of pericementitis every time you filled a root, because there are constituents in the oil of eucalyptus that are irritating. Oil of eucalpytus has three constituents, the main one, eucalyptol, being the most volatile. The first one that distills is eucalyptol, because it is the most volatile constituent of the three. Eucalyptol is not nearly as irritating as the oil of eucalyptus. Still, it is slightly irritating, and if you use too much in moistening the canal you will still have slight soreness following the filling of the root. You can modify the irritating action of the eucalyptol and at the same time add disinfecting properties, and get the peculiar action of thymol by adding to the eucalyptol, menthol and thymol.

℞ Menthol .....gr. iij
Thymol .....gr. ij
Eucalyptol .....f ℥j—M

Sig.—Use as directed.

Thymol is added because of its peculiar property. The menthol is for the purpose of modifying and allaying the irritating qualities of eucalyptol. If you put into the eucalyptol too much of these substances, thymol and menthol, you will find that you have interfered with the solvent action of the eucalyptol on gutta-percha. I experimented some time with that preparation and found that I could put in three grains of one and two of the other without destroying the solvent action. I have in this prescription thymol two grains, menthol three grains, eucalyptol one fluid dram. You can use that in cases where you moisten the root canal.

You can modify that preparation and get another one, which is excellent in cases of weeping abscess. Sometimes after you cauterize a sinus and treat the root you will have a weeping condition. You can check that secretion or weeping from the canal better by using another formula.

℞ Thymol .....gr. x
Eucalyptol .....f ℥j—M

Sig.—As indicated.

Here we do not care anything about the solvent action of the eucalyptol, and an excellent prescription to use there is ten grains of thymol to a dram of eucalyptol, leaving out the menthol.

I will have to curtail my remarks when I talk about remedies for

treating putrescent pulps and abscesses, because, if I have a hobby, that is it, and I do not wish to take up too much of your time. I come to the discussion of remedies to be used in treating putrescent pulps and abscesses with a great deal of satisfaction. Up to two or three or four years ago remedies were selected for the purpose of treating putrescent pulps and abscesses solely and only because of the power or property those remedies possess for killing bacteria. Now, there are bacteria, lively ones, in a putrescent root canal, but if you have studied the process of pulp decomposition, if you have studied the decomposition of any dead animal tissue, and then the changes through which that tissue goes as it putrifies or ferments, you will find that substances form in the process which are obnoxious, and which must be taken into consideration in the treatment of putrescent pulps and abscesses, as much as micro-organisms. Animal tissue is composed of proteids, carbohydrates and fats. As the carbohydrates ferment you have formed, among other things, gases. The main gas is carbon dioxid. Now, there isn't much of the carbohydrates in pulp tissue; so in treating a putrescent pulp, or in trying to get rid of the intermediate products resulting from decomposition, you do not need to consider much CO_2. But the main constituent of animal tissue is proteids; and as these proteids putrify and undergo decomposition among the first things produced is the liberation of a gas, hydrogen sulphid, H_2S. Other intermediate products, which form quite early in the putrefaction of proteid material are ptomains. Among those ptomains have been discovered two deadly poisons, putrescin and cadaverin. These substances are formed as a result of the action of some bacteria on the proteid material. These two substances are capable of setting up inflammation, suppuration and necrosis. As these nitrogenous bases or ptomains are further putrefied you have, as a result of that further putrefaction, ammonia gas. Ammonia is slightly irritating, and if you confine those gases, among which we find carbon dioxid, hydrogen sulphid and ammonia, you are going to have trouble. As Dr. S. G. Perry of New York said: "I don't know what kind of gases they are, but I do know there is something there which if I confine in that putrescent canal I am going to have trouble with." I believe these are the things that we find there. Now, you want to take into consideration the presence of these substances as well as the presence of micro-organisms. Instead of selecting mercury bichlorid, which is a good disinfectant, in-

stead of selecting sublamin, which is a good disinfectant, for the purpose of treating these conditions, try to select substances which will take care of and act upon chemically, if possible, these other substances besides the micro-organisms.

I must call your attention to one thing further in connection with decomposition. There is not much fat in the original pulp tissue. Dr. Harlan and some other of my friends think there is none. But it doesn't make any difference where there is any original fat in the pulp tissue or not. Besides the ptomains, the hydrogen sulphid and ammonia, which are the end and intermediate products of putrefaction of the proteids, we have also, as an end product, fats. Every one of you, whether you know anything about chemistry, pathology, decomposition of animal tissue or not, know that you have removed from a pulp canal time and again a partially decomposed pulp, which, if you had cared to, and had placed it between your thumb and finger, you would have found it to be unctuous; fatty in character. It resembles fat, looks like fat, and some of it is fat—as the story goes. Now, then, it is well to take into consideration the presence of fat in a putrescent root canal in treating this condition, even though we cannot prove chemically that fat is an original constituent of the pulp tissue. In the journals, some years ago, formalin, a 40 per cent solution of formaldehyd, was recommended. We got too many sore teeth, and then we used 20 per cent. Then they got it down finally to a 2 per cent solution, oftentimes still sore teeth. Again we saw in the journals the suggestion that you can use equal parts of creosote and formalin as a good remedy in the treatment of putrescent pulps. If any of you have tried to mix beechwood cresote and formalin you have found that they don't mix. They will not make a chemically clear solution (illustrating). Now, I can clear this solution by heating it, but as soon as it gets down to the normal temperature it will get milky again. I like everything clear and colorless. You can clear the solution, however, by adding alcohol to it. The alcohol is only used for the purpose of clearing up the solution. You can clear up the solution by taking ten minims of the alcohol to every dram of the formalin and creosote.

℞ Creosoti
Formalini .....aa f℥ j
Alcoholis .....m xx—M
Sig.—Use as directed.

Now this is a remedy which you can buy of the man who comes in your office at 75c for half an ounce. You can mix it yourself, and get it for 3c. If it wasn't for the fats that resulted from the decomposition of that pulp, and other reasons which I will mention later on, that remedy would be good. You can put it into the pulp chamber, no matter how putrescent it is, and seal the cavity with cement. That is the beauty of it. Any remedy that you can seal absolutely at the first sitting is a good remedy, because you prevent the remedy from getting out into the mouth of the patient and his tasting it as long as you are treating that tooth; and you prevent the saliva, laden with bacteria, from getting into the cavity of the tooth. You can do that by using this first remedy. But, cresote will not act upon the fats to the same extent as some other agents. Now, tricresol was a remedy used by Drs. McWhinney and Cook, of Chicago, a great deal in the practice of dentistry. Tricresol is now recognized by the pharmacopœia as "cresol." Cresol and formalin, equal parts, a remedy suggested by myself, is a far better remedy to be used in the treatment of putrescent pulps and blind abscesses than is creosote, formalin and alcohol for many reasons.

℞ Cresolis.
Formalini .....aa f℥ j—M
Sig.—Use as suggested.

You think they will not mix at first, but by simply shaking the container (illustrating) it will make a nice clear solution, without the addition of alcohol or the use of heat. Phenol (carbolic acid) is a better disinfectant than creosote. Cresol has been proven to be three times as good a disinfectant as is phenol; so cresol is preferable to creosote as a disinfectant. Cresol acts to advantage upon the fats which are an end-product of decomposition of the pulp, and as a result of that action of cresol upon the fats we have produced something analogous to lysol, a good disinfectant. Cresol modifies the irritating action of the formaldehyd, which is constantly generated from the solution. Now we have learned three or four reasons why cresol is better than creosote and is better than phenol. Phenol and formalin will mix in all proportions and is not a bad remedy. Cresol and formalin is better, as I have explained. That remedy can also be hermetically sealed in the tooth.

If I thought that I was justified in going into the technique of how to apply it I would be glad to do so, but I do not believe, it hav-

ing been before the profession three or four years, that I would be justified in taking up the time of this society to do that. I will hurry over the technique by saying you must do two things—or one thing, and not another. You must have the pulp chamber exposed, or opened into freely enough to expose all the root canals, so that the remedy will act upon the contents therein. If you do not the tooth will ache. If you freely expose the pulp chamber and seal in the remedy it will not ache—if the canals are all exposed. That is one thing you must do, expose all the canals to the action of the remedy. Secondly, you must seal that in hermetically, without pressure. Now it is difficult to seal in a large occlusal cavity hermetically any remedy without producing pressure when stopping or gutta-percha is used, and if you succeed in doing that, and the patient forgets and bites on that side the filling will give and you will have trouble. You can seal the remedy better with cement. I will simply say, the worse odor you have in that root the better your remedy will act. You do not need to lose any sleep because you put in a cement filling and sealed the remedy over the putresecnt canal. I want to tell you why—you can seal that remedy hermetically too. We have briefly—perhaps too briefly—figured out the end products which result from the decomposition of the pulp. It is the gases which cause the trouble—I mean, as far as hermetically sealing the tooth is concerned. Your remedy must kill the gases, if I may put it that way. Now in chemistry we all know that when ammonia and chlorin, two gases, come in contact with each other, they unite freely, and as a result a solid is produced. Now here the gas that comes from our remedy is formaldehyd, CH_2O, and it comes in contact first, we will say, with the ammonia, also a gas, in the putrescent canal.

First reaction—$6\ CH_2O + 4\ NH_3 = (CH_2)_6N_4 + 6\ H_2O$.

The two gases unite, forming urotropin, a solid; that is, not only a solid, but a substance used in medicine for the purpose of disinfecting the urinary tract. Perhaps it would not be bad to leave it in there, in the tubuli of the tooth.

Second reaction—$2\ CH_2O + 2\ H_2S = 2\ CH_3OH + S_2$.

Your formaldehyd gas will also unite with H_2S.

One gas coming in contact with another, forming a liquid. In the first reaction you have a solid; in the second reaction a liquid; the solid formed as a result of the action of formaldehyd upon the ammonia. The liquid as a result of formaldehyd acting upon the

H_2S. If you take care of the gases chemically, if you kill them, as it were, or if the gases unite to produce a solid and a liquid, you know you do not need to worry, and we can hermetically seal these remedies in the roots of teeth containing putrescent material.

Some object to the odor; not very many, because the result is so beautiful that you forget the odor. I do not like the odor of creosote myself; cresol has about as bad an odor. If you object to the odor of creosote you can use this remedy that I suggested to be sealed in the canal from which you have removed a live pulp, as an anodyne, thymol, menthol and phenol.

R Pheno-mentho-thymol.
Formalini .....aa f℥ j—M

Sig.—Use as indicated.

It, too, will mix with formalin in all proportions. You see (indicating) it is a beautiful colorless liquid, making a clear pharmacal product. It, however, will not act upon the fats to the same advantage as will your cresol. Now, here is a remedy which contains phenol, thymol, menthol and formaldehyd, which you can seal in any putrescent canal—an excellent remedy to use; but from a chemical point of view it will not dispose of the fats which are formed.

I want to call your attention again to No. 3. When you have a sinus established and you want to cauterize it, instead of using phenol you will find that you get equally as good results with a much better remedy by using pheno-mentho-thymol.

Now I am going to hurry along. Mr. Chairman, you will pardon me, I trust, because I am taking up so much of your time. I am sorry I have to do it, but it seems to be necessary.

℞ Acetanilidi .....gr. viij
Syrupi simplex .....f℥ ss
Spiritus frumenti .....f℥ ijss—M

Sig.—Take one-half at once and the remainder in one hour if required.

Here we have a remedy which you can use in cases of facial neuralgia, or in those cases where you have an incipient abscess; where you have used your local treatment, but until your local treatment is going to take care of those gases in the tooth you know it will ache for an hour, or five or six hours. You can control that pain by giving a general hypnotic. One of the best is acetanilid. Acetanilid,

while it is a hypnotic, while it acts upon the central nervous system, is a heart depressor. But you can overcome its depressant and gets its analgesic action if you combine a heart stimulant. Here we have whisky, a cardiac stimulant, to overcome the depressant effects of acetanilid. The pharmacopœia has tried to introduce something to take the place of so many proprietary remedies, the formula of which we do not know. I do not believe we ought to use anything, especially internally, that we do not know the constituents of the mixture, and know the properties of the various constituents. To offset that rapid influx of proprietary remedies in medicine, the pharmacopœia has introduced a "compound powder of acetanilid."

Acetanilid .....70 parts
Caffein .....10 parts
Sodium bicarbonate .....20 parts

Caffein is added here for the same purpose that the whisky is added in this one (No. 10), to overcome the depressant action of the acetanilid.

In writing a prescription for any pharmaceutical preparation or official preparation you never have to include in that prescription all of the constituents. All you have to do is to write a prescription for the official name, which is here "compound acetanilid powder."

℞ Pulvis acetanilidi comp.....gr. xv
Ft chartulæ No. 2.

Sig.—Take one at once and the other in an hour if not relieved.

In prescribing these general hypnotics many are prone to believe that we do not know enough about drugs and medicines to prescribe them, no matter whether the trouble is of dental origin or not, and we would be criticized if we had a fatality much more than a physician. To obviate, perhaps, the possibility of that criticism, in prescribing the hypnotic drugs it is best, for dentists especially—it isn't a bad thing for physicians—to not prescribe for more than perhaps will be enough to produce the desired result. Do not prescribe for such an amount as would perhaps kill the patients if they were to take it all. Sometimes these patients having neuralgia will ignore your directions, and they will take one powder right after another if they think they will get ultimately good results without waiting for the action of the first powder. It takes some little time to get it into the circulation. They will take one right after another, and the

drug may have accumulated with a toxic result. Prescribe then for four doses, or perhaps no more than two.

℞ Zinci iodidi .....gr. xv
Aquæ .....m. x
Iodi (crys.).....gr. xxv
Glycerini, q. s. ad.....ʒ j—M

Sig.—Use where indicated.

Here is a remedy that you will get beautiful results from in treating pyorrhea. This is zinc iodid; water, iodin and glycerin. This remedy was worked out for Dr. Talbot by C. N. S. Halberg, professor of pharmacy of the Illinois University. This remedy you will apply after having scaled the roots, especially in cases of flabby gums, where acid is not indicated. Apply in the pocket and over the septum of the gum. You will find that the gum will shrink and hug the neck of the tooth more readily than with any other remedy. A man by the name of Lugol some years ago discovered a chemical fact that if he would make a solution of potassium iodid in water he could dissolve iodin to the extent of 5 per cent. Halberg has taken advantage of that pharmaceutic fact. He has taken the zinc iodid, which is a highly deliquescent substance, and added enough water to liquefy. Ten minims will more than liquefy the 15 grains of zinc iodid; and then to that he has added 25 grains of the crystal iodin and made a nice creamy mixture by adding glycerin, only as a vehicle. Talbot wanted a solution of iodin in glycerin to which some astringent had been added. That is not quite Talbot's formula; it is practically the same. I have modified it some.

℞ Phenolis.
Acidi sulphurici .....aa ʒ j
Aqua .....fʒ ij—M

Sig.—As directed.

Phenol-sulphonic acid, 50 per cent. If you have an abscess where the pus has stood in contact with the root until it has been absorbed, or the end is rough, and you do not expect to cure the abscess by forcing through that process phenol, you ought to cure that case by forcing phenol-sulphonic acid through. Where the pus has stood in contact with the root until you have quite a considerable area of pericemental membrane destroyed, and perhaps the end of the root, and a roughened edge of either process or root, there you have either to cut off the end of the root or accomplish the same thing by the

use of an acid. Several acids have been suggested, but one of the best acids to use under those circumstances, as well also as in a pyorrhea pocket, when medicated, is phenol-sulphonic acid, made by taking equal parts of phenol and sulphuric acid; chemically pure phenol and chemically pure sulphuric acid. A great many tell you that you can make this preparation by taking phenol and sulphuric acid in equal parts, and then if you want to get the 50 per cent (which is generally used—in pyorrhea pockets you ought not to use over 25 per cent)—they tell you, you can dilute that original phenol-sulphonic acid mixture with water. It cannot be done unless you again know something about pharmacy or chemical laws and their application to practical pharmacy. You can mix, however, the phenol and sulphuric acid and make a nice clear solution. Ordinary 95 per cent phenol and sulphuric acid, chemically pure, will make a nice clear solution; taken in equal parts (illustrating). If you take the crystals of phenol and heat them in an evaporating dish and add sulphuric acid you will get phenol-sulphonic acid in a clear solution. Also if you want to make a 50 per cent solution, or the 25 per cent, you cannot get it by simply adding water, because you separate your phenol. Now, after I have added the phenol and sulphuric acid, granting that I had a clear solution, and then the water, I can heat that solution all day—I don't know whether I could or not, but I have heated it five or ten minutes, and perhaps half an hour—without making that phenol go back into solution. But you can overcome that if you will make this preparation in the following manner, and that is what I want to illustrate. If you will take 95 per cent phenol and heat it nearly to boiling, then while hot add as much sulphuric acid as you have taken of the phenol, then to that mixture, while still hot, you add your 50 per cent of water, there you have made a 50 per cent solution of phenol-sulphonic acid; and you have got a good clear solution without precipitating or reprecipitating the phenol.

When you apply phenol-sulphonic acid to a root canal for the purpose of cauterizing a sinus, and at the same time smoothing up the rough edges of the processes or end of the root, you must not apply it to the canal or cotton. It will make a mush and be difficult to handle. You want to apply this remedy to the canal on threads of asbestos or silk. With your unvulcanized red rubber you make a plunger, having the alcohol

ready to cauterize the mouth of the sinus as it passes through, or having a little blotting paper with an opening over the mouth of sinus, dipped in vaseline, letting the oil neutralize the acid as it passes through.

The next prescription is a good mouth wash.

℞ Sodii bicarbonatis.
Sodii boratis .....aa ℥ j
Zinci chloridi .....gr. vj
Thymol .....
Menthol .....aa gr. j
Alcoholis .....℥ ij
Glycerini .....℥ iv
Aquæ cinnamomi.....q. s. ad f. Oj—M

Sig.—Use as directed.

If you want an astringent, you will find that an excellent one; one that your patients will like, and one you will like.

I want to caution you against having your patients use mouth washes too frequently when they do not need them. Dr. Cook has found that the constant use of some of these mouth washes on the market interferes for hours with the action of pepsin on the starchy foods. So this matter of having patients use antiseptic mouth washes daily, when a saline solution or simply water, will accomplish the same result, is wrong. If you want to hold in abeyance, however, the micro-organisms in the mouth, you must use some mouth wash. You can use this one with excellent results. Now, the pharmacopœia here, like in the case of so many of these hypnotic headache preparations, to overcome the gradual influx of mouth washes, has introduced in the last edition an official mouth-wash, which is shown over here, U. S. P. formula:

Boric acid .....20 gm.
Benzoic acid .....1 gm.
Thymol .....1 gm.
Eucalyptol .....0.25 cc.
Oil peppermint .....0.50 cc.
Oil of gualtheria .....0.25 cc.
Oil of thyme .....0.10 cc.
Alcohol .....250.00 cc.
Water, to make .....1,000.00 cc.

When you want to write for a mouth wash all you need to do—instead of acting like parrots, instead of signing your name on a line with "D. D. S." at the end on a so-called blank prescription for the proprietary mouth washes—instead of doing what you can let the public know that you know enough about drugs and medicines to write an intelligent prescription for a mouth wash that is a counterpart of, or better than any proprietary mouth wash on the market to-day. You can write for that solution. You do not need to write "boric acid, thymol, benzoic acid," etc.—you do not need to write them all out. You can simply write the official name:

℞ Liquoris antisepticus .....f℥ viij

Sig.—Dilute with one-half water and thoroughly rinse mouth, as directed.

That shows much more intelligence on your part than to sign your name to these blanks, which are so freely furnished for the miscellaneous use of these proprietary mouth washes. You do not even need to remember the exact constitutents of that mouth wash. You can easily remember, however, that this mouth wash contains 2 per cent of boric acid, one-tenth per cent of thymol and benzoic acid; 25 per cent of alcohol, and other aromatics and antiseptics in an aqueous solution.

℞ Orthoform.
Europhen .....aa ʒ j
Liquidi petrolati q. s. to make a paste. —M

Sig.—As directed.

The next one, No. 18, you will get much benefit from, especially country dentists, where you have to do a great deal of extracting in allaying the pain after the extraction; if you have separated the process, or if the process is attached to the cementum of the root; or if you have had to go down and expose the process more or less; in any of those conditions from which you have severe pain you can stop that pain almost like magic by its use. Now it is claimed by some that orthoform is a disinfectant. It is not a good disinfectant, but is an excellent local anesthetic. You can prolong the anesthetic effect if you add europhen. Europhen is a substitute for iodoform. It is an insoluble product which, when it comes in contact with water, gradually gives off iodin.

Combining these two, and adding to that liquid vaselin, it makes an oily paste. After drying the exposed part, apply the oleaginous paste and you can control the pain. You do not need to be afraid; if the patient lives in the country and cannot come in handily, and you think the pain will not stop by the time the anesthetic effect has passed away, you can give them some of the paste and let them apply it themselves. It must be applied to an abraded surface.

The next is a prescription for local anesthesia. It contains cocain hydrochlorid as a local anesthetic, phenol for the purpose of keeping the solution sterile, and peppermint water as a vehicle. The phenol is added two minims to the ounce, which is a little less than one-half of one per cent. It is enough, with the peppermint water, to keep the solution sterile. You can inject phenol into the tissue to the extent of one per cent without any perceptible coagulating action of the phenol on the albumen. Here we have less than one-half of one per cent. The peppermint will mask the bitter taste of the cocain hydrochlorid.

℞ Cocainæ hydrochloridi .....gr. vj
Phenolis .....m. ij
Aquæ menthæ piperitæ .....f℥ j—M

Sig.—Use as a local anesthetic.

NOTE.—¼ gr. of cocain is contained in every 19 minims of the solution.

I have taken up a great deal of your time and I appreciate fully the interest that you have shown this warm afternoon. I will feel well repaid if in my rambling remarks here I have succeeded in convincing this audience that what we need in dentistry to-day more than the rapid influx of these proprietary remedies, the constituents of which we do not know, is a broader knowledge of pathology and a broader knowledge of drugs and medicine.

MANIFESTATIONS OF SYPHILIS IN THE MOUTH. By R. W. Irving, M.D., C.M., Toronto, Ont. This subject is one of vast importance to the dental profession, because of the fact that it is rapidly on the increase in certain districts where the increase of Canadian immigration brings with it the diseases peculiar to

older and more thickly populated districts. While it is usually associated with lives of licentiousness the most cruel examples of its ravages are seen among those innocent of wrong. Not infrequently, doctors of both medicine and dentistry, while performing their usual duties become infected and suffer prolonged illness, which, if not carefully treated, leads to lives of misery, ending in an equally miserable death.

To the dental surgeon the recognition of a syphilitic case becomes of importance since he is dealing with a contagious disease. A scratch or small cut upon the fingers from the teeth in a syphilitic mouth during its contagious period will readily infect the operator. The instruments used in such operative work will become, unless carefully disinfected, a source of infection for other people. For such an event the dentist would be open for legal procedure that could prove a very grave financial loss as well as doing much injury to his practice and reputation. To have a knowledge of the syphilitic condition of the patient would in many cases alter the dentist's prognosis so far as his results are concerned. Especially in dealing with fillings in patients under mercury as a treatment, would much of the work prove unstable. In plate work, where syphilitic inflammations of the deeper structures existed, alveolar periostitis, and all inflammations of the hard and soft palate, would the results prove unsatisfactory in a short time.

For practical purpose the disease is divided into two types, i. e., acquired and hereditary.

The *acquired form* is characterized by an infection upon some abraided or mucous surface, manifesting itself in three stages of: (a) Primary; (b) Secondary: (c) Tertiary Symptoms.

The primary sore manifests itself at the seat of infection in eight to twelve weeks from the time of infection. It may be found upon the lips, tongue, tonsils and rarely upon the inner surface of the teeth. The mode of infection may be from using infected drinking cups, from kissing a person whose mouth has the Secondary symptoms bearing infected secretions. In other cases the fingers coming in contact with a syphilitic sore may be inserted into the mouth, infecting any region touched. The tonsils, always

ready to absorb germs of disease, readily seize upon such material infections to start trouble.

The Hunterian, or hard chancre, presents in the mouth the same symptoms as elsewhere. In three to six weeks after contagion a small papule is noted. This becomes irritated and inflamed and the tissues beneath become infiltrated, giving rise to a hard and cartilaginous base. To the touch this is hard and shotty with little or no pain and tenderness. It shows a slow growth and has very little tendency to spread or to disappear until the Secondary symptoms become evident, when it gradually disappears of itself. It leaves in its place a small cicatrix, or may leave no signs whatever.

During the Secondary stage of the disease, which manifests itself in from six weeks to three months from the termination of the initial sore, a copper-colored rash appears upon the skin. At the same time this rash is to be found in the mouth as patches of more or less reddish inflammation, upon the center of which is found a greyish secretion. These are found along the sides and tip of the tongue and upon the inside of the cheeks, pharynx and palate. Upon the tonsils are noted symmetrical ulcers, often more or less kidney shaped, having a tawny grey base with abrupt and ragged edges. As these progress, the symptoms become more defined, going on to form a cavity. This is filled with a serous and sanguineous purulent secretion. The margins become more inflamed, more ragged, red and soft, upon touching they bleed readily.

Should ulceration occur, as it frequently does, upon the velum and especially upon the uvula, during the later part of the Secondary stage, it leads to a destruction of these parts. This may produce a perforation of the soft palate or a sinus in the area of junction of hard and soft palates. This condition together with the mucous patches will almost positively lead to a diagnosis of syphilis.

When the ulcer locates itself upon the hard parts the inflammatory infiltration process starts between the periosteum and the bone. This by shutting off the blood supply and nutrition may lead to necrosis of the bone. As the necrosis progresses a perforation of the hard palate occurs and cases are not infrequently noted

where it has advanced until a complete destruction of the entire osseous structures of the palate and nose is accomplished. The mucous patches on soft parts are painless or nearly so, and after lasting a few weeks they usually heal, leaving very little scar. If they become ulcerated there will be left a more or less puckered cicatrix. Occasionally upon the tongue and at the corners of the mouth, where the patient's general condition is more or less debilitated, these patches take on a hyperplastic character, become raised and may give typical examples of condylomata, or what are sometimes called, "Hutchison's Wart." They consist of an overgrowth of papillæ, whitish in appearance, from the superficial epithelium becoming sodden. They may attain great size and assume a cauliflower appearance. It is a peculiar fact that where condylomata are found at the mouth they are usually found at the anus. All secretions from the patches, and more particularly from "Warts" and condylomata, are very infectious, and by merely coming in contact with mucous membranes, as with abraided skin, readily gives us a new case.

Between the period of Secondary and of Tertiary symptoms, there is generally a period during which the patient presents no symptoms, and considers himself perfectly well during such *latent* period. This may extend anywhere from six months to fifteen or twenty years, when the gaumata are observed. They are nodules of connective tissue infiltration, either diffuse or localized, and may be found in practically every organ of the body. It becomes a matter of great importance to the practitioner of dentistry to be familiar with the characteristics of such syphilitic manifestations in the buccal and facial regions of the maxillæ. Mistaken diagnosis of such cases has led to a complete resection of the maxillæ when a course of antisphilitic treatment was indicated. It may develop under a plate leading to a misfit. During the period of tumefaction when marked œdema is present, the swelling, which is hard if in the palate or canine region, may simulate a dental abscess or canine cyst. The history of the case and the development that follow in the case of abscess and of cyst, usually leads to a clearing up of the diagnosis.

It may be necessary to decide whether the mouth symptoms are those of Secondary or of Tertiary stages, since one is infec-

tious and the other is not. In the Secondary, the ulcerative condition is superficial and marked by swelling and inflammatory deposit, but not loss of tissue. In Tertiary it is a rapid spreading ulceration of the palate and pharynx, with a distinct loss of tissue. This commences at one, two or more points and spreads irregularly, while the scars left have a great tendency to contract. Such contraction may narrow the pharynx and lead to difficulty in deglutition.

It is in *Congenital* Syphilis that the dentist has presented to him one of the most trustworthy among the objective symptoms of that form of the disease. If the patient be of age to show teeth the malformations noted are almost pathognomic of congenital syphilis and even in the absence of history of the disease are in many cases sufficient evidence upon which to base a diagnosis. *The central incisors of the permanent set are the test teeth in all cases.* These teeth are usually short and narrow, with a broad vertical notch in the center, with their corners rounded off. Horizontal notches and furrows may often be noted but these have nothing to do with syphilis.

In the deciduous teeth the characteristics are not so regularly marked, as they seem, in many cases, to escape the syphilitic conditions of the system present in the second set. But in these, as in the second set, the central incisors are found to present the malformations and of these the upper ones are most constantly characteristic. However, changes in the deciduous teeth are found in syphilitic cases more commonly than in the non-syphilitic. Sometimes the tooth sacs suppurate and the crowns of the teeth, almost always of the upper incisors, may be exfoliated before they are cut. This fact goes to prove that the gums and tooth sacs tend to inflame and congest during the Secondary stage of syphilis in infants.

A more common condition than suppuration and exfoliation is to find caries set in. The neck of the tooth is attacked and being readily eaten through, the crown drops off. In this manner, attacking the incisors of the upper jaw, the child may be left without teeth from the age of two to six; especially is this true if the lower incisors are attacked in the same way. This is very often

caused by the mercurial treatment administered to the mother while the child is yet in utero.

In the permanent set certain *untrustworthy signs* ought to be noted so as not to lead to a wrong diagnosis (as given by Jonathan Hutchison):

1. All transverse marking (i.e., lines which cross several teeth on the same level) are untrustworthy.

2. All mere defects in enamel formation leading to pits or irregular breakages are untrustworthy.

3. Foliated or wart-like projections on the teeth are untrustworthy.

4. Peg-like teeth may suggest syphilis or may not. Are untrustworthy.

The characteristic malformation of the upper central incisors consists in a dwarfing of the tooth, which is narrower and shorter than normal. On account of the atrophy of the middle lobe there is left a broad notch in vertical position in the edge of the tooth. Sometimes from this notch there passes upward a shallow grove on both the anterior and posterior surfaces of the tooth, extending as far as the gum. This notching is usually symmetrical and may not be confined to the incisors, as we sometimes find the cuspid showing it. In some cases the teeth are very irregular, sometimes diverging, at other times slanting towards one another. Since the teeth are short, narrow and dwarfed, their sides do not touch, leaving spaces between them.

The general facial expression will aid the dentist in drawing conclusions as to the correctness of his suspicions of inherited syphilis. A sunken bridge of the nose caused by the long continued swelling the nasal mucous membranes when the bones are soft; a skin marked by little pits and linear scars especially near the angles of the mouth, the relics of ulcerating eruptions; and protuberant frontal eminences consequent upon the inflammation of the periosteum during infancy, are amongst the points which go to make up what is recognized as *heredito-syphilitic physiognomy.*

Having thus quickly noted the chief symptoms of syphilis in the mouth the differential diagnosis becomes very important. For, to accuse a patient of being syphilitic, or to even suggest such

a possibility, without good reasons, may lead to the loss of a patient who considers himself done a personal injury.

Noting the palate, we may find malformations, as cleft palate or the congenital absence of the uvula. But *any acquired perforation of the palate is syphilitic,* the result of ulceration and necrosis as described above. Very rarely is it the result of injury or operation. All congenital clefts are recognized by their median position, or if in the alveolar process are at one or both sides of the maxillary bone.

The *ulcers* found upon the palate may be:—(a) Tuberculous; (b) Syphilitic; (c) Epithelioma; (d) Hard chancre.

The *Tuberculous* is superficial, slowly spreading and painful. It is covered with pale granulations and associated with evidences of tubercular trouble in the larynx, lungs or tongue.

In the *Syphilitic* ulcer it is found starting behind the molar teeth, creeping slowly inward over the palate, and showing evidence of healing at one edge and spreading at the other. The edges and base are deep and sloughy, while the whole has a tendency to necrosis of bone, followed by perforation and cicatricial contraction.

The *Hard Chancre* is a single ulcer on the hard or soft palate raised above the general surface. Its base is hard and firm while the surface is smooth.

In the case of *Epithelioma* the ulcer of the palate has firm infiltrated edges and base, the surface is uneven or raised and warty, discharging a foul-smelling, purulent fluid. It makes a steady advance, involves neighboring lymph glands and is usually found in a patient past fifty years of age.

Noting the *tongue certain tumors present themselves.* These are:—(a) Warts; (b) Gumma; (c) Abscess; (d) Cysts.

The Wart is characterized as a branched villous growth, without induration or swelling.

A Gumma on the tongue shows a firm infiltrating tumor growing rapidly in the substance of the tongue, and giving no inconvenience except for its size. It has a tendency to soften in center, ulcerate and break down.

An Abscess of the tongue is not uncommon occurrence. It is a fluctuating mass with an evidence of some preceding injury. The

surrounding tissue is swollen, red and tender, showing acute inflammatory reaction.

Cysts of the tongue occur upon the mucous membrane. They are superficial, of a bluish opalescent appearance and perfectly painless. They are globular in outline, being filled with fluid, and are hence translucent. There are no signs of inflammation, and they exist for a long time.

Among *the ulcers of the tongue several varieties* are noted. Among the more common of these are:—(a) Apthous; (b) Local, from a plate or ragged tooth; (c) Mercurial; (d) Syphilitic; (e) Dyspeptic; (f) Tuberculous; (g) Epithelioma.

The *Apthous form* of ulcer is that frequently seen in cases of young children where they have what is often called "Thrush," or is found in cases of simple germ infection. These are superficial, painful and tender. They are not single but are multiple, and are found along the sides and tip of tongue. Similar ones are found along the inner margin of the lips and the inner surface of the cheeks. They commence as small white blisters, run a rapid course and are accompanied by slight salivation.

When *Local* ulcers are noted they are found along the sides of the tongue. Opposite to the ulcer is found a mass of tartar surrounding the sharp angle of a tooth or some projection from a plate. Removal of the local irritation allows the ulcer to heal readily and in all cases no glands in the neighborhood are enlarged.

Where a patient is treated with large doses of *mercury,* the tongue shows marked ulceration. It is swollen, salivation is marked, the breath has an intense fetid odor. The ulcers are along the under surface of the tongue and at the tip. The surface is grayish, while the gums are swollen and softened, and are receding from the teeth.

Syphilitic ulcers of the tongue are superficial, may crack the tissue on the sides and tip of the tongue. In connection with this the dentist can readily slip his fingers down the back of the neck and map out the superficial lymphatic glands that are hard and shotty, also note a coppery-colored eruption on the skin on such parts as the arms, hands and possibly the face.

Dyspeptic ulcers on the tongue may occur on the dorsum of

the tongue. They are always superficial and circular; free from induration and without glandular enlargement.

Tuberculous ulcer, if on the tongue, has a thin, undermined edge and a pale, depressed, shreddy base, with evidence of tubercular trouble elsewhere.

In the case of an *Epithelioma* of the tongue it is usually found in a middle-aged person. It has a widely indurated base and thick, everted edges. The surface is irregularly warty, and from it oozes a foul, watery discharge. The neighboring lymph glands may become enlarged, but are softer and fewer than in Syphilis.

Where Syphilis is noted by the dentist he can protect himself by careful disinfection of hands after operating, by disinfecting instruments and by refusing to insert the finger into the mouth if the skin on the finger should be broken. His influence may be such as to convert the patient from a hopeless case to one that under careful treatment for two years, with mercury and potassium iodid, might become practically cured.—*Dental Practice.*

DR. MILLER'S OBSERVATIONS ON THE WASTING OF TOOTH TISSUE, VARIOUSLY DESIGNATED AS EROSION, ETC., VIEWED IN THEIR RELATION TO THE POWER POSSESSED BY SALIVA OF CONTROLLING ACID DECALCIFICATION. By Joseph Head, D.D.S., M.D., Philadelphia, Pa. As one who has been experimenting for the last four years on the subject of enamel erosion and abrasion, I should like to offer a few criticisms on Dr. Miller's detailed and suggestive work.

In the *Cosmos* for April, 1907, page 406, I asked why Dr. Miller relies upon the litmus paper test to determine the alkalinity, neutrality, or acidity of the saliva, when the same saliva will frequently turn blue litmus red, and red litmus blue; while Sutton, the great authority on acidimetry, says that a saliva which is neutral to litmus may be acid to turmeric paper and alkaline to lacmoid or Congo red? In the July *Cosmos*, page 677, Dr. Miller in answer says: "I have no particular litmus test, but made use of the test as ordinarily employed in chemical laboratories." Later on in the same article (page 678) he says: "I am therefore per-

fectly willing to admit that tests of the saliva made by litmus may not always be reliable."

If Dr. Miller did not employ the litmus test in a manner peculiar to himself, or did not think it particularly reliable, why does he give such specific directions for its use as in the March *Cosmos,* page 228: "The reaction of the mucus of the upper as well as the lower lip should be taken by lifting up the lip and inserting a strip of blue litmus paper on one side of the jaw and red on the other, leaving it there until saturated. To determine whether the acid comes from the lip or from the gums insert two pieces of litmus paper separated by any impermeable substance which does not affect the reaction. The reaction should be taken before rinsing the mouth, as *in this way only do we obtain true information as to the condition present at the time."* [Italics mine.]

If Dr. Miller knew that the litmus test was "not always reliable," why, in the March *Cosmos,* pages 228 and 229, does he report fifty-two litmus tests on various patients and twenty-five made by Mr. Brusendorf? If litmus is "not always reliable" in determining the practical acidity or alkalinity of the saliva, would not all the deductions made from those seventy-seven tests be valueless—or at least misleading from a person of such authority as Dr. Miller?

As a further proof of this inadequacy of litmus, if anyone will make a 1:20,000 water solution of (Kahlbaum's or Merck's) acid sodium phosphate, he will find that it will neither turn blue litmus red nor red litmus blue. And yet if a tooth be placed in this solution, at the end of from ten to twenty days the enamel will be translucently whitened, softened to the cut of a lancet, and in some cases corroded, especially where the enamel cuticle has been ground off and the spot polished. In fact, a 1:20,000 solution of acid sodium phosphate in most of the tests will act more vigorously than a 1:20 or 1.2,000 solution of the same salt. The fact that a weak acid will sometimes accomplish what a strong acid cannot will be dwelt upon later.

In the July *Cosmos,* page 678, Dr. Miller says at length: "While I am therefore perfectly willing to admit that tests of saliva made by litmus may not always be reliable, I do not see

how a stricter observance of this fact could have materially modified the results of my investigations, since *I was not dealing with general but with local defects, in which the general condition of the saliva is not of primary importance.*" [Italics mine.] ". . . The question to be solved is this: If we add the dibasic sodium phosphate to a solution of the acid sodium phosphate or of the acid calcium phosphate until the solution turns red litmus paper blue or until the reaction of the acid salts is obscured, do these salts still retain their action on the tissues of the tooth?" He then shows a series of experiments on dentin sections with the acid and basic phosphates that conclusively prove that where there is enough basic phosphate in a solution of acid phosphate to turn red litmus blue, there is no action on the dentin. As Dr. Miller says, "This question cannot be answered by theoretical deductions." (July *Cosmos,* page 679.)

For some time past I have been experimenting on the effect of a similar mixture of acid sodium phosphate and basic sodium phosphate on tooth enamel, and I know that not only is Dr. Miller right in his conclusion that an acid phosphate mixture modified by a basic phosphate mixture to the point of turning red litmus blue and blue litmus red would not hurt enamel, but I would say further that a mixture of acid sodium phosphate with so small an amount of the basic sodium phosphate as not to blue the color of red litmus paper in the slightest degree may still have no perceptible effect on the enamel of the tooth.

Test: A 1 per cent solution of acid sodium phosphate and a 1 per cent solution of tribasic sodium phosphate were made. Of these, 38 cc. of the acid salt solution were mixed with 10 cc. of the basic salt solution. This mixture would turn blue litmus red, but would not in the slightest degree turn red litmus blue. A piece of natural enamel placed in this solution kept at body temperature for from sixteen to eighteen days was absolutely unharmed, while other pieces in a 1 per cent solution of acid sodium phosphate alone (Merck's) were decalcified in half the time.

Thus we have a further proof of the error into which litmus may lead us. If a solution turns blue litmus red and fails to change red litmus blue, the presumption according to the litmus is that there is enough acid present to hurt the tooth, when in

reality the corroding action of the acid may be under control. Thus the litmus may be the means of leading the clinician or scientist astray. It is about as reliable as if the engineer of a railroad did not know whether the red light meant danger or safety.

For the sake of those following in Dr. Miller's footsteps, I am glad that he admits in his letter in the July *Cosmos* that the litmus test is not "always reliable." But if it be not "always" reliable, how is anyone to know when it may he relied upon and when it may not? At present we have to confess that we have no means of detecting minute quantities of acid in the saliva that may nevertheless be sufficient to corrode the teeth; while, on the other hand, acid may be plainly indicated and yet no harmful action result.

DR. MILLER'S ABRASION TESTS.

Dr. Miller's abrasion tests with grit powders and brush alone are valuable, and are no doubt accurate, because the question of saliva acidity or alkalinity does not materially enter as a factor. These conclusions agree almost absolutely with the conclusions of some less extensive tests which I made on the subject some two years ago, and which were published in the *Dental Brief*. Dr. Miller (July *Cosmos*, page 678) speaking of my *Dental Brief* paper on abrasion, says that because I said there might be a chemical as well as a mechanical cause, and suggested acid calcium phosphate, I did not foresee that other acids or acid salts could also cause erosion. When I wrote that article I had found by numerous experiments that very weak solutions of many acids combined with a minimum of abrasion might cause wasting. I only mentioned acid calcium phosphate as one of the salts which caused decalcification with a smooth surface, and therefore might *possibly* cause erosion without abrasion. I am at present in doubt on this possibility. Very weak solutions of lactic acid or acid sodium phosphate will also make smooth decalcification surfaces without abrasion as an adjunct, and there are probably others yet to be found.

The procedure in Dr. Miller's simple abrasion tests is not questioned, but when we come to examine his tests of the alternate action of abrasives and acids on the teeth, his technique is open to question. For instance, on pages 117-122 of the February

Cosmos he gives twenty-three experiments on the alternate effect of acids and abrasives on teeth; solutions of tartaric, oxalic, lactic, citric, sulphuric, phosphoric and hydrochloric acids are used in from 1 to 10 per cent solutions. In Dr. Miller's simple friction tests he took pains to approximate normal conditions, while in these acid tests he has used solutions that could not possibly be found naturally in the mouth. Should he not at least have reduced his solutions to a point where they could be tasteless? If 1 part lactic acid to 2,000 parts of water be very perceptible to the taste, and if 1 part lactic acid to 1,000 parts of saliva be noticeable to the taste, it follows that the strong solutions used render all of the acid abrasion tests open to question, and before reliable data can be had on the subject they will all have to be repeated with solutions that could be normally found in the mouth. While some strong acids will unquestionably corrode where a weaker solution will not, it must be remembered that with some acids a weaker is more corrosive than a stronger solution. For instance, if a tooth be placed in pure anhydrous, sulphuric, lactic, valerianic or butyric acid, it will stay unharmed for days and weeks at a time, but a 1:10,000 or 1:20,000 lactic acid and 1:5,000 valerianic or butyric acid will perceptibly attack both enamel and dentin.

In March *Cosmos,* page 229, Dr. Miller says that a 1 per cent solution of acid sodium phosphate acted upon a section of a tooth for six weeks without producing the slightest visible effect upon either enamel or dentin. He also says that a 5 per cent solution of acid sodium phosphate, acting for a year, only superficially disintegrated the external surface of a sound tooth. I have found, in experimenting with this salt in 1 per cent and 5 per cent watery solutions, that the acid sodium phosphate does not attack the enamel so as to roughen it, but leaves it translucently white and smooth. This has also been the experience of Dr. Kirk. This very mildness of the action of the acid sodium phosphate is just the action that would make smooth erosion with a minimum of abrasion, and Dr. Miller must have been looking only for the corrosive, harsh actions of his 5 to 10 per cent solutions when he wrote in March *Cosmos,* page 229, "With my present understanding of the subject I have some difficulty in recognizing the acid sodium phosphate as a potent agent in the process of chem-

ical abrasion, because of its comparatively slight action upon the hard tissues of the tooth." He certainly overlooked the possible mild, smooth, deteriorating action on the enamel of very weak solutions of acid sodium phosphate, acid calcium phosphate, or lactic acid, when he said in March *Cosmos*, page 246, "Acids in general, especially in the strength in which they occur in the mouth, cannot produce wasting." But one fact partially explains Dr. Miller's differences in observation: 1:20,000 acid sodium phosphate will, in many instances, more deeply and effectively cut tooth enamel than 1 part to 20. I here give a few tests, chosen from the many that I have repeatedly tried, which I should be glad if Dr. Miller or any others who are interested would repeat for verification.

THE WRITER'S TESTS ON CORROSION OF ENAMEL BY ACID.

The following tests on corrosion of enamel by acid were made on teeth incased in rubber tubing tied at the end near the tip of the root. A point of enamel was left exposed. By pressing the rubber back, absolute comparison of exposed and protected enamel could be made at any time. The teeth before they were used were first washed and kept for a week in 50 per cent alcohol and glycerin. During the tests the enamel was not only examined microscopically for color changes or roughening, but it was also tested with a sharp lancet to see if its resisting strength was being undermined by the effect of the acid. The tests were made with C. P. acid sodium phosphate obtained from Merck's and also from Kahlbaum's laboratories. The enamel cuticle seemed to protect some teeth more than others. Some teeth only corroded on the edge of the enamel that had been battered by mastication or where the enamel had been cut with a stone and polished. Some showed a smooth surface that seemed normal except when cut by the lancet, while others gave a white, soft, paint-like surface that was easily scaled off.

Teeth rubber-protected except for a small portion of projecting enamel were placed in acid sodium phosphate solutions of 5 per cent, 2 per cent, 1 per cent and 1:500, respectively. Each solution was in amount about 200 cc. They were put in sealed jars and placed in a culture oven at body temperature. After seventeen hours' immersion all these teeth had smooth, white, polished,

decalcified surfaces which when dried approached the normal appearance. Later, a tooth was placed in 1:20,000 solution of acid sodium phosphate. At the end of fourteen hours the first signs of corrosion were noticeable. This was polished off with stone and polisher. Eight hours later it was examined, when unmistakable whitening of the polished part was noticeable. In two days decalcification occurred that could be easily pared with a lancet. In ten days it was badly corroded, with a smooth, white surface.

In some other tests a 5 per cent, 1:2,000 and 1:20,000 solutions were used simultaneously. At the end of eight hours the tooth in the 5 per cent solution showed unmistakable signs of defalcification, while the 1:2,000 and 1:20,000 solutions showed no decalcification. At the end of twenty-four hours the tooth in the 5 per cent solution still showed progressive signs of decalcification, the tooth in the 1:20,000 solution also showed positive decalcification, while the tooth in the 1:2,000 solution remained apparently untouched. At the end of seven days the tooth in the 1:2,000 solution still showed no decalcification, and it was then placed in the 1:20,000 solution, and in seven days more it was plainly decalcified, showing that the 1:20,000 acid sodium phosphate solution decalcified enamel that had withstood a 1:2,000 solution. Also, while the 1:20,000 acid sodium phosphate solution did not start as quickly to decalcify the enamel as the 1:20 solution, the action of the 1:20,000 solution of acid sodium phosphate was more uniformly progressive, and ended by cutting the enamel much more deeply than the 1:20 solution.

As I have before stated, enamel resists the decalcification of acids or acid salts most unevenly and erratically. The battered enamel at the cutting edge or near the point of a cusp is usually attacked first, but not always. Sometimes one tooth will resist a solution that will rapidly attack another tooth of apparently just as sound structure, under apparently the same conditions. In fact, the subject of tooth decalcification by such acid solutions as may be found in the mouth is a very large subject, and much work needs to be done before an authoritative statement can be made on the matter.

The white spots made by the acid action of acid sodium phos-

phate or acid calcium phosphate are so much like the white spots that frequently appear in the mouths of many patients that it is possible that the acid sodium phosphate or acid calcium phosphate may be the cause of the strangely appearing smooth white enamel surfaces that have so long mystified us. The smooth erosion of the acid phosphate salts is explained by Dr. Kirk by the fact that as the acid phosphate attacks the enamel surface it is converted into the basic phosphate, which is precipitated, and this necessarily retards the action of the acid salt.

NEED OF CONTROL TESTS WITH SALIVA SOLUTIONS.

Let us now discuss the advisability of control tests with saliva solutions. On pages 115 and 116 of the February *Cosmos* Dr. Miller speaks as follows: "The question has been brought up as to whether solutions of acids in water act differently from the same solutions in saliva. I have only one experiment to report on this question, Teeth were halved and the corresponding halves were subjected to a semi-saturated solution of acid calcium phosphate in water and in saliva respectively for thirty-four days. The action of the water solution seemed to be more intense than that of the solution in saliva." Thus Dr. Miller puts aside the necessity for control tests with saliva by saying that the action of the watery solution is more intense than the saliva solutions. He is certainly correct in his observation, but it falls far short of the true significance of saliva action. Saliva not only retards the action of acids, but in many instances absolutely inhibits it.

Take for example Dr. Miller's test of the action of carbonic acid on tooth structure. Because, as stated in February *Cosmos*, page 115, he finds a tooth becomes decalcified by water charged with CO_2; and because he used a watery solution of CO_2 where the gas bubbles passed the submerged tooth and corroded it in four days (March *Cosmos*, page 226), he concludes that "carbonic acid attacks both dentin and enamel vigorously" (page 246). Unquestionably a watery solution of CO_2 will decalcify tooth structure, but to argue from that that CO_2 from the lungs or the CO_2 in the saliva would also cut the teeth would be to prove Nature guilty of a foolish oversight. If CO_2 either in the saliva or from the breath could decalcify enamel, long before any of us came on the earth there would not be any enamel. With that

preliminary thought I made the following test: An ordinary "sparklet" siphon was used for these experiments, and they were carried on, as were all the tests, in a culture oven where a temperature of 98 degrees F. was constantly maintained:

A tooth was incased in rubber tubing as previously described, a small portion of sound enamel being exposed. This was done so that the contrast between the exposed enamel and the unexposed might be noted, and the first change could thus more readily be detected. Such a tooth was placed in the siphon with about two ounces of water, the contents of a steel shell of condensed CO_2 were discharged into the solution, and the flask was placed in a culture oven. At the end of twenty-four hours the tooth was taken out and examined. The enamel showed distinct signs of decalcification. The same tooth was replaced in the flask and the solution again charged with CO_2 as before. At the end of three days the enamel was so badly cut that portions of it could easily be scraped off with the thumb-nail.

Then a new rubber-protected tooth with a small portion of the enamel exposed was placed in the flask with two ounces of saliva, a few drops of chloroform being added as usual to prevent fermentation, and the same amount of CO_2 discharged into the solution. At the end of four days the tooth was removed and examined, and the enamel was smooth and sound. A new solution of saliva was made, and was charged with CO_2. At the end of thirty days it was removed, and the enamel was found unaffected. This same tooth, which had withstood the concentrated action of CO_2 saliva solution for thirty days, was then washed in alcohol to remove the grease and was placed in a watery solution of CO_2; in twenty-four hours it was badly decalcified, showing conclusively that a watery solution of CO_2 would in twenty-four hours cut an enamel that had withstood a similar saliva solution of CO_2 for thirty days.

These tests have been repeated sufficiently often to convince me that my observations are accurate.

Just as saliva inhibits the action of carbonic acid, it also has an inhibitory effect on many other acids. The 1:500 watery solution of lactic acid, at body temperature, will cut and decalcify tooth enamel in thirty minutes, while a tooth can stay at 1:500

lactic acid saliva solution without roughness or apparent weakening of the tooth structure for fifteen days. On the other hand, the inhibitory effect of the saliva is overcome when the lactic acid is present to the extent of 1 per cent in a saliva solution, and the tooth enamel is found to be cut in from one to five minutes—about the same length of time as though a 1 per cent watery solution of lactic acid had been used. We gather from this that saliva has no positive inhibitory action on such strong solutions of lactic acid; but are such strong solutions of lactic acid found normally in the saliva? A 1:20,000 watery solution of lactic acid in three days has softened the grinding surface of a tooth so as to allow a lancet to cut a smooth shaving from the surface, but the part protected by the enamel cuticle was apparently unharmed. At the end of five days even the cuticle surface could be scratched, showing that a watery solution of lactic acid imperceptible to litmus or any other test might decalcify a tooth and make it an easy victim to abrasion or attrition. A 1:6 watery solution of lemon-juice equal to about 1 per cent citric acid will decalcify tooth enamel in ten minutes; at the end of half an hour it causes rough decalcification; while a 1:6 saliva solution of lemon-juice did not cut tooth enamel in two days.

There are many experiments that I have made showing the power of saliva to inhibit the action of acid, and yet where such acid action is inhibited the saliva may sometimes show violent acid reaction to litmus. It is interesting to note that, while saliva will inhibit the action of 1:500 lactic acid or 1:100 citric acid, it seems powerless to do more than slightly retard the action of acid sodium phosphate or strawberry-juice in their decalcifying action on tooth enamel. These tests were as follows:

A molar was cut in halves lengthwise through the root and enamel. Each half was rubber-protected, with small portions of sound enamel and a part of the broken edge exposed. These were placed respectively in 50 cc. of a 1:2,000 and 50 cc. of a 1:10,000 saliva solution of acid sodium phosphate. A few drops of chloroform were added to the saliva solution to prevent fermentation. These solutions were placed in air-tight jars in the culture oven, at the temperature of 98° F. The enamel in the 1:2,000 saliva solution remained smooth and apparently hard

during five days; at the end of that time the lancet began to make scratches on the smooth enamel surface. In eight days the broken edges of the enamel were white and distinctly softened, while portions of the enamel covered by the enamel cuticle could be easily carved with the lancet. For eight days the cuticle of the tooth in the saliva solution of 1:10,000 sodium phosphate protected the tooth, but at the end of that time the enamel rods of the broken enamel surface began to show slight but unmistakable signs of decalcification. The saliva used for this test was distinctly alkaline to litmus.

Strawberry tests: A tooth with sound enamel was wetted with a drop of saliva and plunged into a ripe strawberry. At the end of one and a half hours it was withdrawn, washed in running water, and dried with the air-blast. The worn surface of the enamel was decalcified, but the cuticle-protected surface was unharmed. The tooth was then wetted with more saliva and replaced in the strawberry. At the end of four hours and a half it was examined as before, when both cuticle and worn surface had lost their gloss through decalcification. A single rub with a napkin, however, restored the gloss—to all appearances as bright as before.

This shows how smooth erosion may arise from acid alone aided by the mastication of ordinary food.

Two sound teeth were then selected and incased in rubber tubing as before described, so that only enamel was exposed. These were placed respectively in two solutions, one of half-crushed strawberry and water, the other of half strawberry and saliva, with a few drops of chloroform as usual to prevent fermentation. In fifteen hours the enamel of the tooth placed in the watery solution was badly cut; the tooth in the saliva solution was also cut, but not nearly to such a degree, the saliva having somewhat retarded the action. In five days both teeth were so much cut that the enamel of each was mushy. I also found that pure orange-juice in four days made a smooth decalcification of enamel that could be cut with a lancet; in five days white decalcification was visible.

Rhubarb, grape-fruit, and other fruit acids are at present under experimentation, but as I have not had time to make control

saliva tests, I hope to report on them later, as well as on the saliva tests of acid calcium phosphate. In these fruit tests I have tried to use acid solutions such as would ordinarily be found in the mouth. Of course, when the acids first enter the mouth they are practically full strength, but ordinarily, with a free flow of saliva, any controlling action will be exerted before material decalcification can occur. Still, during the times when a fruit pulp is bitten into by the teeth, any protecting power of the saliva can exert very little influence, and for that short time the teeth are exposed to unrestrained action of the undiluted fruit acid.

In summing up my paper, let me reiterate that the litmus test is unreliable because it may not detect the presence in the saliva of weak acids that can nevertheless cut the teeth. And on the other hand, even when it demonstrates markedly the presence of acid, such demonstration is of little clinical or scientific value, as the litmus does not reveal in the slightest degree whether the acid indicated is controlled or is in a condition in which it is free to harm the teeth.

Let us further note that the saliva has decided powers of protecting the teeth from acid decalcification that can hardly be explained by its contained alkaline salts. It is possible that this inhibitory action of normal saliva on acids may be temporarily suspended by certain diseases, or that certain fevers, drying the mouth and stopping the flow of saliva, may allow certain acid fermentations to cause decalcification that the presence of saliva in the ordinary amount would have controlled. It is possible that potassium sulfocyanid or some other salts acting catalytically on the saliva may set free the action of acids or acid salts that otherwise would have been controlled. Gout or rheumatism may suspend the controlling action of the saliva over acids, or by letting loose acid sodium phosphate may by this agent attack the teeth, for the saliva I have tested does not seem to be able to inhibit the corroding action of acid sodium phosphate.

In conclusion, it should be noted that the saliva, instead of being the cause of tooth decalcification as some have supposed, seems on the contrary to be a valuable protection to the teeth against the invasion of corroding acids. Investigation along this line is very young, and much more is to be desired, as greater knowl-

edge concerning the ionic action of saliva, as well as its action as a living fluid, will make many problems clear that are yet unsolved.—*Dental Cosmos.*

THE CAUSES OF FAILURES AND SUCCESSES IN CROWN AND BRIDGEWORK. By Hart J. Goslee, D.D.S., Chicago, Ill. It is generally recognized that universally successful achievements in any chosen direction, and particularly in the field of art and mechanics, are to be attained largely by the acquirement of special skill, and that such is purely the product of development. Hence, since the development of any art or craft must first pass through all of the experimental stages, and since these particular stages are usually fraught with failures, need the barometer of any one's pride or vanity drop perceptibly in acknowledging them; and am I also warranted in venturing to tread upon an already well-trodden path? I do not essay to do so, however, from the viewpoint of either philosopher or genius, but simply from that of the craftsman, and as applied in a practical way to our craft.

That we should meet with failures now and again is to be expected, and that we are usually honest enough with ourselves to acknowledge them is to our credit, but do we always study the cause, or causes, and do we endeavor to profit thereby? If we do, then an occasional failure only serves to stimulate us with a desire to avoid the possibility of a recurrence, and such a desire tends to develop the best that is in us, and thus, in turn, will we develop individually, and will dentistry advance. On the contrary, however, if we fail to observe and closely study the causes of our failures, we can never hope to overcome them, nor to aid others in avoiding the same pitfalls, and our mission, therefore, will be but to retard rather than to advance the progress of our chosen work.

The profession of dentistry is still young. Many of its now most prominent departments, or specialties, are largely the product of the past decade. These must pass through the experimental stages; skill must be acquired; better textbooks must be written, and empiricism must give place to method and system before we can hope to eliminate, or even to greatly reduce, the proportion

of failures. The frequency with which they are encountered, however, can be materially diminished by an early recognition of the fact that in an art which requires so high an order of special and versatile skill as does dentistry we can only hope to acquire it, and the good, sound judgment which comes with it, by developing system and observing detail.

Perhaps nowhere in the entire scope of dentistry is this more essential than in the specialty of crown and bridgework. This particular field of our art is just passing through the experimental stage, and our methods have heretofore been nothing if not empirical; hence failures were necessarily an inevitable consequence, and it is largely the purpose of this effort to attempt to classify them, to point out some of the most common instances, and to suggest the reasons, and perhaps remedies, therefor.

For the purpose of presenting a more or less systematic arrangement of the subject, I have chosen to classify failures in the following order: First, those due to what may be termed unnecessary causes; second, those due to errors of judgment, and third, those due to faulty technique.

UNNECESSARY FAILURES.

In considering the first phase of the subject, as thus classified, I want to begin by saying, with all of the emphasis at my command, that many failures are unnecessary ones, and that a large proportion of those encountered by many practitioners can be directly attributed to one or the other of two or three general causes, any one, or all of which might be eliminated by a display of more conscientious effort.

These constitute either a failure to appreciate the necessity for a close observation of, and attention to, details in our everyday work; a wanton recreancy in first acquiring knowledge, and at least ordinary skill before undertaking the execution of a class of work, the successful application of which demands both; or the absence of any higher ideals than an unscrupulously mercenary ambition.

Indifference to the importance of observing details is a very large factor in accounting for failures, for the reason that anyone who neglects to do so, or who does so in a desultory or perfunctory manner, cannot hope to develop method and system, and

the development of these is as essential to the acquirement of skill as is oxygen to life.

While personal equation and natural aptitude have much to do with the ease and facility with which skill may be developed, yet, to a degree at least, it may be acquired by almost anyone who is willing to make such application as is necessary to first cultivate and then develop it.

That many are not willing to make this application, however, is evidenced by a prevailing tendency which to me seems pernicious, and which at best could only be expected to invite failures; I refer now to the common practice of relegating work of this character to dental machine shops, and to maintain that it is pernicious for at least two reasons: First, because he who pursues such methods is usually indifferent or incompetent, else he would do it himself, or at least have it done in his office and under his direct supervision; and, second, because the laboratory man, not having seen the case, is equally indifferent, and knows even less, although he may be a more skilled artisan.

As an instance, a dental friend of mine recently had occasion to visit one of the several large laboratories which thrive in Chicago, and while there chanced to engage in conversation with a young lady, who proved to be the assistant of a more or less prominent practitioner. During the course of the few remarks exchanged, it developed that her mission was to have a band for a crown made in circular form and soldered, and that it was her fourth trip from a distance of three blocks for this purpose, the band failing to fit after the three previous attempts.

Whether the occasion for this incident was due to a lack of facilities or to incompetency on the part of the practitioner is immaterial, for in either event, to undertake to do that for which you have no facilities, or for which your time is too valuable, or concerning which your knowledge is too limited is presumptuous and dishonest; is a flagrant injustice to the patient and a menace to the progress and advancement of the profession.

I am too optimistic to feel that such practices are common, and yet too observing to fail to note that they, or similar ones are more so than they should be. Hence, until we can subdue such avariciousness, take ample time for our work, and confine our

efforts to lines with which we are familiar, and in which we have been willing and able to acquire ordinary skill, we cannot hope to avoid what must therefore be characterized as unnecessary failures, or to achieve universally successful results.

Whilst I do not maintain that we can all become equally skillful, or that in order to avoid such failures each and every one must necessarily do all of his own work, I do maintain that one should at least know how to do it, and that, as far as possible, the actual execution should be confined, more or less, to his general supervision. If this is not possible, then both the interest of the patient and the character of the work must otherwise become secondary considerations.

Although these expressions may sound like a plea for specializing, or for the recommendation of patients to the specialist, and while such is quite in accord with the tendency of the day, and is not to be deplored, still the motive is rather to encourage the acquirement of skill, and to lay special emphasis on the assertion that in a class of work most of which must be done in the mouth and all of which is to subsequently become an important part of the human economy, no one is justified in assuming to do that which he himself is incapable of doing.

Another practice which is common, and yet one which can only be classed as a failure, from this viewpoint, is that of applying artificial crowns to teeth which might otherwise be restored and more or less permanently preserved.

Whether such a practice is to be attributed solely to gross avariciousness or flagrant dishonesty, or not, is, in a way, immaterial, but it is a common practice, and, in my opinion, it is inexcusable, and therefore a failure, for the reason that in these days of modern methods an artificial crown should be applied only as a last resort, and never because of the fact that its application would possibly entail the expenditure of less effort and energy on the part of the operator than would be demanded in the insertion of a filling.

While a well-made and properly adapted artificial crown has probably long been regarded as being the most permanent operation in dentistry, still it is also a fact that its presence does disturb the normal condition of the soft tissues surrounding the neck

of the tooth supporting it, irrespective of how it may be made, or how perfectly it may be adapted.

For this reason, therefore an artificial crown should never be inserted unless the preservation of the tooth by means of a filling is more or less impossible, or for the purpose of obtaining anchorage for bridgework, or of correcting irregularities, or removing conspicuously discolored teeth, and when it is done for any other reason it must be regarded in the light of a failure, because of the fact that the tissues contiguous to the neck of a tooth remain more normal, and consequently more healthy, around a well-made filling, than they do around a well-made crown.

FAILURES RESULTING FROM ERRORS OF JUDGMENT.

Passing from this aspect of the subject, let us now consider that viewpoint which embraces such failures as result from errors of judgment.

In this connection, good judgment, like special skill, is an attribute which can only be acquired with experience. Yet so closely associated are the two that, while we cultivate one we develop the other. Therefore, in proportion as we direct our energies toward acquiring skill, will we be also enabled to exercise that judgment which is a prerequisite to success, in this or in any other field, the foundation of which is built upon mechanical principles.

Dynamics.—As applied to bridgework, one of the chief causes for failures is the woeful display of ignorance concerning the fundamental principles of mechanics and the utter disregard of the laws of dynamics, which is so frequently evidenced.

As a result, fixed bridges are too often constructed for cases where a removable type of fixture is indicated; pieces which are entirely too extensive for the number and stability of the supporting teeth are inserted, and adequate strength to sustain the ravages of continued masticatory work frequently does not obtain, either in the form of attachment used or in the final assemblage of the parts, or both.

Fixed Bridges.—The tendency to place fixed bridgework any and everywhere, irrespective of the type of attachment used, and of the number and stability of supporting teeth, is also entirely too common. This class of work is successful only in proportion

as it may be inherently strong and judiciously applied, and because of the dynamic requirements, it will be found that "judicious application" will apply far more often to small pieces of from two to five or six teeth than to those in which a greater number are involved.

Large Fixtures.—In view of the numerous attachments for supporting removable fixtures which are practicable, and which may be used successfully, a larger proportion of the extensive cases should more frequently be made in this manner. If they were, fewer failures would be recorded; fewer good, sound teeth would be ruthlessly destroyed, and far more hygienic results would be obtained.

Saddle Bridges.—In order to insert fixed structures in cases where it is evident that the support is inadequate, an effort to more closely observe the dynamic requirements by increasing the resistance of the piece to stress is frequently made by using a "saddle."

While this type of construction may be successfully used under very favorable conditions, it often proves a failure, however, from a hygienic aspect, if not from a mechanical viewpoint.

But as both of these features are essential elements of success, they must be combined, and to be thus obtained they can only result from confining the application of a saddle to such cases as offer opportunity for a good, close adaptation to well-absorbed tissues, and for an adequate and more or less unyielding support at each end, and even then the application should be made mainly for the purpose of affording opportunity for restoration of lost tissue.

Extension Bridges.—Another common practice which often leads to failures is that of suspending one or more teeth beyond the abutment, or abutments, without sufficient support, or without some mechanical provision against leverage. Generally speaking, such a principle is mechanically wrong to begin with, and such cases can only be successful in proportion as the resistance of the supporting tooth is adequate to overcome the power of the lever, and to thus sustain all of the stress assumed by the suspended tooth, or teeth, in every direction.

Porcelain Bridgework.—The injudicious and indiscriminate use

of porcelain in the construction particularly of "fixed" bridgework is also the cause of many failures. In this connection it must be remembered that porcelain is a friable material, and hence cannot be relied upon as offering sufficient resistance to the more or less powerful stress of mastication unless it may be of such bulk as to possess inherent strength, and then so supported and protected by the metal substructure as to insure its integrity. And, again, granting that the application may be judiciously made, and the metal substructure physically adequate, failures often result from overfusing the body or from using a surplus of pure gold as a solder.

Removable Bridges.—While fewer "fixed" bridges and more "removable" ones would insure a greater proportion of successes than is now generally obtained, yet failures even in this type of construction are by no means rare.

These are due largely to a failure to obtain adequate strength in the attachment used to support the structure, and this in turn is due mainly to the use of such attachments as are manufactured for this purpose, many forms of which are built more upon the lines of beauty and delicacy than upon those of inherent strength.

When adequate strength in the attachment does obtain, however, many failures occur as a result of injury to the remaining natural teeth, and such injuries are usually due to an unnecessary contact between the structure and the necks of such teeth, which results, first, in mechanical abrasion, and, second, in subsequent loosening.

FAILURES RESULTING FROM FAULTY TECHNIQUE.

Having thus directed your attention to some of the causes of failures from the viewpoints mentioned, let me now pass to a consideration of that class which occur almost every day and which are to be ascribed to faulty technique.

Mechanical Irritation.—Perhaps the most common and flagrant evidence of failure is to be found in the inflammatory condition of the tissues surrounding the necks of roots supporting artificial crowns, which is so frequently observed. Indeed, even at the present time, it is surprising how very few cases we see which do not show such evidences to a greater or less extent.

Is this condition to be attributed to a chemic or a physiologic incompatibility between the crown and its supporting root? Possibly to the former in rare instances, but certainly to the latter in most cases, and artificial crowns are physiologically incompatible, mainly, if not only, because of the mechanical irritation which they offer.

This disturbing element, however, arises from a single source—faulty adaptation—and this can in turn be attributed to a single cause—faulty technique, either in root preparation or in the adjustment of the crown.

Therefore, it does not matter so much what type of crown is used; if there is no chemic incompatibility, physiologic disturbances can be overcome by avoiding irritation, and the possibility of irritation can be avoided by proper adaption.

Thus, the somewhat mooted question as to whether a band encompassing the end of the root and passing within the free margin of the gum is the cause of the trouble, or not, or whether one should or should not be used, is not the vital issue, for the cause can only be removed by obtaining an adaptation which precludes it.

This brings us to a consideration of the combined therapeutic and mechanical requirements incident to the preparation of roots, and to conclude that they are often not properly observed, for if they were, fewer failures of this type would be noted and greater comfort and longevity would result.

Articulation and Occlusion.—Faulty articulation and occlusion is probably the next most common cause of failures in this class of work, and one which can only be attributed to indifference on the part of the operator, because the requirements are definite and positive.

In this connection, if fewer modeling compound impressions were used, and better models obtained, and if our work were constructed on articulators, such as afford a lateral movement, and the adjustment in the mouth then more carefully observed before dismissing the patient, greater usefulness and a much smaller proportion of failures in the form of fractured facings and broken or loosened fixtures would result.

The proportion of these and of all of the various other forms

of failures which can be attributed to faulty technique could be greatly reduced if we would but take more interest, exercise more care, and spend more time is observing details.

Economy of Time.—The intuitive tendency, and even eagerness, which is manifested by so many to economize time by "cutting corners" and using so-called "time-saving" methods is largely responsible for the failures which are to be attributed to this common cause, for the reason that the advantages gained are usually doubtful, and often fallacious.

Any effort to save time is laudable, and to be commended—providing it is consistent and conscientious; and the adoption of methods and "systems" which will aid in accomplishing such an object is always warrantable—providing they prove to be practicable; but we must never lose sight of the fact that "short cuts" are often a dangerous experiment, and that to gain time at the possible expense of results is false economy.

The Causes of Success.—To be successful, what shall we do? Mainly this: Acquire skill; cultivate system; be conscientiously painstaking and scrupulously observant of details. Ascertain the causes of failures and endeavor to avoid them. Take sufficient time first to plan and then to outline how the work can best be done, and then do it properly, and undertake nothing until you are first familiar with it.

In proportion as these fundamental requirements of success may be observed will the percentage of failures be reduced, will our work improve, and will this phase of dentistry advance beyond the pale of empirical laboratory mechanics.—*Dental Summary.*

AN APPEAL TO THE YOUNGER MEN OF THE PROFESSION. By Dr. S. H. Guilford. Anyone who has pursued the practice of dentistry for a sufficient length of time to have gained experience, who has kept in touch with the dental world in its broader aspects, and who has given the matter careful and serious thought, must admit that the great need of the profession to-day is more general intellectual activity.

Those of us to whose lot it has fallen to visit and meet our professional *confrères* in various sections of our country—both

those old in practice and those just beginning; students in colleges and those in middle life—cannot fail to have been impressed with the limited horizon of a large proportion of very estimable practitioners.

Their lives have been useful; they have served, and are serving, their communities well; they enjoy the esteem and gratitude of those whom they serve, and yet the fact remains that as a class they have expended their mental and physical energies too largely within the narrow confines of office practice.

This criticism is not made in any captious spirit; it is not prompted by the pessimism that sometimes creeps in upon those whose better part of life lies behind them, but it is the result of years of careful thought and close observation. More than once we have heard from the laity the expression: "Dentists are nice people, but they are narrow." The remark carried a sharp but unintentional sting, and it was all the more irritating because it was more than half true.

In thus giving expression to an unpalatable truth, we are not unmindful of the large number of men who have graced our profession with their high intelligence, broad mental grasp, extensive learning, and creditable incursions into the domains of science, art, and literature; for without them and their self-sacrificing labors, dentistry would not have made, in one century or less, the wonderful advancement of which we are all so justly proud. History will do them full justice, but it is not a comforting thought to realize that their places are not being filled in as large a measure as the growth of our profession would seem to warrant.

Among the younger practitioners of to-day there seems to exist an apathy or lack of desire to make some return for the rich heritage of the past. Once out of college, they bend every energy to the acquirement of a practice that shall fill all the hours of the day, and this accomplished they rest content and feel that they are fulfilling all of life's mission. They lack ambition to lead a higher professional life by contributing to the general professional welfare in the way of mental effort or self-denying labor. Their horizon appears to be bounded by the four walls of their offices, and they are unwilling to devote their evenings either to scientific research and literary effort in the line of their vocation, or to civic

or humanitarian work outside of it. By thus confining themselves to routine professional work, they cease to broaden and develop as they should, and this gives the world occasion to stigmatize us as "narrow."

We are speaking of the masses, not the exceptions, for among the latter there are those who do their part as best they can in local and general society work, on dental examining boards, and sometimes in the colleges. Some few pursue a special line of research or experimental work, and embody the results obtained in valuable contributions to professional society literature; but these are not many when compared with the membership of a profession such as ours.

College chairs to-day are filled largely by men who came upon the scene when dentistry was young, and journals are edited and books written by men past middle life. Who are to take their places when the day of retirement comes? Are the younger men of the profession preparing themselves to step in and carry forward the good work? We wish we could answer affirmatively, but we cannot. It is really a matter of great concern, for these places must be filled, if not by the qualified, then by the unqualified.

Dentists as a class are noted for love of their calling, for hearty good-fellowship, and their willingness to labor along certain lines for the common good of their profession; but we must confess that we do not see a general desire among the younger men to work along intellectual lines, and thus place our profession in a more favorable light before the community at large.

Perhaps the commercial spirit is at work, leading practitioners to be satisfied with a money return for their labors. Possibly it may be a lack of true, philanthropic feeling, coupled with a disinclination to over-exertion and self-denial; but most probably it is an absence of ambition.

Those who in the past have added to our store of knowledge by experiment and investigation; who have devised appliances that have lightened our labors; who have thought out the methods by which many of our practical problems have been solved; who have written our books, taught in our colleges, and edited our journals, have been men who were actuated by a desire to benefit their pro-

fessional brethren, and were ambitious to place our calling on a broader and higher plane.

They were willing to burn the midnight oil, and knew full well the meaning of self-denial and sacrifice. Their chief reward has been a consciousness of a duty well performed and the lasting gratitude of those whom they have benefited.

What higher reward could anyone ask?

Are there not among the younger members of our profession those who are willing to qualify themselves for work along the same lines, and who will be satisfied with the same reward? We certainly hope so for there must be many who, by temperament, mental training, and natural gifts, possess latent possibilities of covering a larger field of human endeavor than the more restricted one in which they now labor.

Let the younger men realize that they owe a debt to their profession that should be paid. Let them feel that the good work which has been and is now being done unselfishly by others must be carried forward, and let worthy ambition stimulate them to earn for themselves the commendation of their fellows by earnest, self-denying labor, which, while it will bring them no money return, will be compensated for by the gratitude of those who come after them.

DISCUSSION.

Dr. Edward C. Kirk: I wish to express my thanks to the essayist for bringing this subject before us and for saying just what he has said in his paper. The subject is one which for many years has seemed to me to be of the utmost importance, and it is certainly well worth while for us to give it the time necessary for its thoughtful consideration. I agree heartily with all that the essayist has said in criticism of our tendency as a profession to become narrow-minded, or perhaps if I should say to remain narrow-minded, it would be nearer the truth. I have, I am sorry to say, been compelled to this view from experience and careful observation, and I have often wondered whether dentistry itself exerted a narrowing tendency upon the minds of its votaries.

I take it that the paper to which we have just listened is a plea for a larger view of things and a broader culture than is to be found within the technical limits of our specialty; a recognition

of the fact that life holds something worth knowing and worth living for besides dentistry. The man who imagines otherwise and who, acting upon such a belief, confines himself exclusively to the study of things dental, is giving himself a narrowly one-sided mental development. His education is comparable to that of the athlete who exercises but one set or group of muscles.

The essayist suggests that the lack of tendency to a broader development in our profession may be due to the prevalence of the commercial spirit among us. Let us not make any mistake about this. I do not know how the author of the paper defines the "commercial spirit," but there is a kind and degree of commercial spirit that is admirable and worthy, and it should be cultivated in professional life as in any department of human activity; by which I mean that every man is justly entitled to fair compensation for the energy, intelligence, and skill that he expends in the pursuit of his calling. He should expect and demand the reward for such service, for it is his duty to maintain himself and those who are rightfully dependent upon him. To that end he should make money, for otherwise he becomes dependent upon himself and a parasite upon society. The mistake is this: It too frequently happens that some forget that money is to be properly regarded as a means to an end only, and they make money-getting an end in itself, which, as a narrowing and soul-destroying process, is without an equivalent.

But dentistry in and of itself has been criticized as having a narrowing tendency. The danger of such an effect is rather apparent than real. It is narrowing if one forgets that other activities furnish the ways and means toward acquiring the same sort of mental satisfaction that many find only in dentistry. The principal source of the satisfying quality which, as I take it, so many dental practitioners find in the details of their professional work, is the pleasure they derive from the accomplishment of a purpose—the doing of things that they originate and can do well and perfectly. It is the satisfaction which Goethe has called the "creative joy." Such work becomes narrowing in its tendency only when done to the exclusion of all other work, which is equally capable of furnishing the same sort of satisfaction to the creative sense. One is broadened in

his mental and psychic scope as he cultivates the possibilities within himself for doing things. More than that, his capacity for enjoyment is correspondingly increased by the discovery of these latent powers within himself and the putting of them to active use.

Some of my friends are getting considerable amusement at my expense because I have just recently learned the trick of successfully sharpening a razor, and because in my enthusiasm over this newborn acquirement I am pleased when once in a while some humorously inclined friend brings me his old dull razor to put in order for him. But, as a matter of fact, I am the one who really gets the most fun out of the transaction, not because I have an inordinate fondness for sharpening dull razors, but because I have discovered that I have within me a new-found ability to do a thing well that I did not know previously I could accomplish at all, and I have been getting as much pleasure out of it as a child does out of a new kind of toy. I wish we could get into the minds of our educators and our students the fundamental idea that it is the chief end of education to develop the latent powers of the individual, both mental and physical, so that he can make the most of them in his life-work—that thus the acquisition of knowledge may have back of it a normal stimulus in the idea that education is a means to an end, and that end the making of a useful citizen; not that study is a necessary system of drudgery which must be gone through with in order to pass examinations.

I regret that the graduates of American high schools, who are recruiting the ranks in dentistry, come to us so deficient in a clear working knowledge of their mother tongue. It is discreditable to our system of preliminary education that so few of its products know the meaning and structure of English words. I recently asked my class the meaning of the word "matriculation," and no one ventured an answer, yet all had matriculated. As teacher and editor I grow tired of hearing about "Laudable puss" and similar monstrosities which would not be possible if thorough drill in English had been enforced in the preliminary educational period.

Europeans as a class and of analogous educational grades know their mother tongue better on the whole than American high-school graduates do theirs; at least that has been my personal experience in coming in contact with a large variety of national-

ities for the past dozen years. We spend more than enough time on preliminaries; what we need is more thoroughness and more intelligence in the use of our time.

I apologize for speaking at such length, but I know of no subject of more importance to dentistry than that presented by the essayist, and I trust that it may continue to receive the consideration to which its importance entitles it.

Dr. Guilford (closing the discussion): In regard to the subject I have chosen, we have it on very good authority that a man should be able to give a reason for the faith that is in him. Varying that a little, I think there should be for every paper an impelling motive—something that leads a man to select a subject and treat it in a particular manner. What I have written and read to you to-day has been on my mind for a long while, and yet there never seemed to be a proper occasion upon which to present it, but I concluded that with the audience I should probably have before me here in Boston, it would be appropriate to bring up the subject and have it discussed. The question may be asked, Why has this matter made such an impression upon me? It is for the reason that for years I have been trying to get some of the young men in the profession interested in college work particularly, and have met with very little success. The men whom I selected—those men who had the benefit and advantage of early education, and who possessed the mental qualities that should make them teachers, writers, or workers—when I approached them upon this subject met me with the reply, "What do I care for these things? I can make more money in my practice." And that is why I spoke of the commercial spirit—so many being willing to be satisfied with what they earn at the chair, and who do not seem to have any sense of responsibility, or any ambition outside of their daily toil.

It seems to me that any man who has reached the period of middle life or gone beyond it, and has not made provision in the way of life insurance or investments to support those dependent upon him in the manner in which they have been accustomed to live, is not the highest type of man; and if that be true in general life, is it not true also in professional life? Do we not all owe a debt to those who are to come after us? Is it not our duty

to contribute of our time and talents toward the uplifting of our profession, and to constitute it a heritage worthy of being bequeathed to our successors? No one has a right to live unto and for himself alone.

One other point. In my younger days, and in my innocence and love for the profession, I believed that dentistry stood upon as high a plane as any other calling in the world, and I lived under that impression for a great many years, until finally I came to realize that outside of the profession and outside of the people I have met or associated with, there prevailed a different opinion. Somehow or other there was a bit of stigma attached to the practice of dentistry—not justly, but still it was there. Some years ago a professional friend crossed the ocean with his wife on his way to Europe, and after his return he told me that when on board the vessel they met several people who seemed to take very kindly to them, and who were disposed to be sociable, but just as soon as it became known to them that he was a dentist, they dropped him. Now what did that mean? It did not mean a reflection upon his intelligence or character, because they had not had any fair opportunity to judge of them, but they were influenced by a popular prejudice, and the simple fact that the man was a dentist caused them to avoid him. Occurrences like these are sometimes met with. For years I would not believe it—I could not realize it.

The way to destroy this prejudice is for all to strive for higher ideals; to develop all the powers that are within us, and to do that in our lives and in our work which will tend to give the world a better opinion of us. Many are doing good work, but the great majority are not doing what they might, and if I could by any means in my power induce the young men in dentistry to broaden their influence in the direction of literary and educational work, I would be glad to do it.

Some years ago I was attending a banquet given in honor of Dr. Miller of Berlin, and sat beside one of the prominent educators of Pennsylvania and of the country. One of the speakers was referring to the great attainments of Dr. Miller—what he had done, what the results had been, etc., when this gentleman turned to me and said, "Why do not more of the men in the

dental profession work along similar lines?" I stated many reasons, giving as one, close application to work and weariness at night; and also that perhaps many were not qualified. I said that I was not qualified to carry on scientific investigation, having had no training in that direction. "But," he said, "have you not been active in society work? I replied, "Somewhat." "Have you not contributed to the literature of the profession?" I said, "A little." "Have you not written a book or two?" I said, "Yes." "Well," he said, "you have done your part. I am not speaking of that, I am speaking of the men who have not done anything outside of their practice." This college professor, though not a dentist, saw what was lacking in the dental profession, and if all dental practitioners could see matters in the same light that he did, it would probably lead to much good.—*Dental Cosmos.*

THE TEETH IN RELATION TO EAR AND THROAT DISEASES. By C. P. Grayson, M.D., Philadelphia, Pa. At the very beginning of my paper I regret that my conscience compels me to make a rather mortifying confession, which is, that I have much reason for believing that the members of my profession, and even of my own specialty, are not nearly so generally alive to the intimate relationship existing between the diseases of the nose, throat, and ear, and those of the teeth, as are the members of yours. It is, for instance, not at all an infrequent occurrence in my work to have patients sent to me by some of the Philadelphia dentists who realize that in order to obtain a successful result from some prosthetic or other measure that they contemplate, an essential preliminary will be the removal of a mass of adenoids from the patient's naso-pharynx, or perhaps of a pair of enlarged faucial tonsils or a marked deflection of the septum that may be seriously interfering with nasal respiration, and consequently with the normal development of the dental arch.

And in the same way it has been brought to my notice that many of you dental surgeons are quick to recognize that certain of the nutritional disturbances affecting the teeth are dependent upon chronic digestive impairment that is attributable to some catarrhal affection of the nose and throat. And yet, how often do I meet with cases of chronic lacunar tonsilitis, or of persistent phar-

yngeal and laryngeal catarrhal inflammations, that have resisted treatment for months simply because the throat specialist has entirely overlooked or has failed to sufficiently appreciate the etiologic influence of a depraved dental condition, and has neglected to call upon you for advice and assistance! It is scarcely to be supposed that any rhino-laryngologist fails to recognize that the nose represents, both anatomically and physiologically, the threshhold of the respiratory tract, but is there any less reason for his clear perception of the fact that it is the teeth that bear precisely the same relation to the digestive tract? Probably no one would dispute the assertion that it is impossible to have a perfectly healthy throat and lower air-passages in association with an unhealthy nose; and yet, I repeat, there seem to be a surprisingly large number of physicians who see no incompatibility between diseased teeth and a normal digestive tract below them.

Of course, it is my privilege to speak only of those portions of the digestive tract with which my special work makes me the most familiar—the mouth, the fauces, and the pharynx; but in my writings and lectures for almost the past score of years I have never neglected the opportunity to emphasize the importance of gastro-intestinal sanitation as an aid to the successful treatment of nose, throat, and ear diseases. There is never a class that graduates from the Medical Department of the University of Pennsylvania without having been repeatedly told that the very first thing to examine when a patient presents himself for the relief of some nasal or throat trouble is the condition of the teeth.

The physiologic analogy between the nose and the teeth is a most striking one. It is the nose alone that by filtering, warming, and moistening the air, prepares it for its subsequent reception by the bronchial tubes and the pulmonary cells; and it is just as exclusively to the teeth that the processes of digestion and assimilation look for the thorough and essential preparation of the food materials that they are subsequently to work upon. It will surely be perfectly apparent that the analogy between these two structures extends likewise into the domain of pathology, for if they are diseased to any material extent the ultimate implication of the lower portions of the tracts of which they represent the beginnings will be inevitable. If they are diseased the respiratory and nutri-

tive streams are both poisoned at their respective sources, and all the remote and later effects of this poisoning will prove irremediable until these primary foci of disease are restored to health.

So much for considerations of a general nature, and now, with a closeness of their relation thoroughly appreciated, it will not be difficult to compile a list of those diseases of the nose, throat, and ear that are etiologically dependent upon dental disease.

To begin with the ear, the frequency of acute median otitis in association with the dentition of childhood is a well-known occurrence, and the conveyance of the irritation from the gums to the middle ear is easily explained by the intercommunication of the nerve supply of the two structures. May I recall to your memories the communication of the greater superficial petrosal nerve with the tympanic plexus, and by means of the Vidian nerve with Meckle's ganglion, which is associated with the superior maxillary nerve, from which the supply of the upper teeth is derived. The small superficial petrosal nerve is also in connection with the tympanic plexus and joins the otic ganglion, and in this way communicates with the inferior dental branch to the lower teeth. The pathogenic connection between the teeth and the middle ear is by no means demonstrated only in children; in adults I have failed a number of times to make much impression upon chronic purulent inflammations of the tympanum until I had secured through the coöperation of the dentist the removal of a persistent reflex irritation of dental origin.

In passing from the ear to the throat, I would like to stop for a moment or two at the nose, and exchange ideas with you concerning the inflammations of the largest and most frequently affected of its accessory cavities—the maxillary sinus. Here we are on common ground, for the diagnosis and treatment of disease in this cavity are as much a part of your work as of that of the rhinologist. To be perfectly frank, I must confess that with reference to the comparative frequency of etiologic activity on the part of the teeth and of intranasal disease in the production of the antral inflammations, I have been during the past twelve or fifteen years more or less of a shuttle-cock. My first opinion was that the teeth were the more often responsible for the antral in-

volvement, but during several added years of experience I accumulated sufficient reason, I thought, for changing my views, and gradually came to believe that it was to infection or to simple extension of inflammation from the nasal fossæ that the larger number of antral inflammations were due; and then, once more, after an unsually long and almost unbroken series of cases that were of unmistakably dental origin, I drifted back to my first opinion. Now, however, with a little further shifting of my ground, I think that I am finally anchored, and I should say that if we exclude the many cases of maxillary sinusitis that are secondary to the infective rhinitis of influenza and grippe, the majority of all the others are traceable to the teeth. Possibly you may tell me a few things to-night that may compel me to modify even this opinion, but I think it is a pretty conservative one now, and that it will not need much alteration.

And now, to descend to the faucial region and the throat, I am perfectly confident that many obstinate cases of chronic lacunar tonsillitis have arisen from and have continued because of neglect of the teeth, and I am equally sure that in the production of a large number of acute infective inflammations of the tonsils, pyorrhea alveolaris and dental caries have played an active part. Am I wrong in thinking that there could scarcely be a more fertile and nutritious soil for the breeding of pathogenic organisms than that found in the cavity of a carious tooth? And when such cavities become over-populated, it is but a short journey to the crypts of the tonsils, which soon become the sites of new and thriving bacterial colonies.

Finally, I think that I am justified in believing that even chronic *laryngeal* catarrhs may be maintained, if not originated, by such diseases of the teeth and gums as I have mentioned. There is no occasion and there would be no excuse for my wearying you with the details of a number of cases in evidence of this, but I need only to say in support of my belief, that in spite of the re-establishment of the health of the nose and naso-pharynx, these laryngeal catarrhs will all prove refractory until the teeth and the alveolar tissues are put in equally good condition.—*Dental Cosmos.*

DENTAL ORGANIZATION IN RELATION TO THE STATE BOARD OF EXAMINERS. By Garrett Newkirk, M.D. It must be evident to everyone who has given the subject thought, that there should be a good understanding, friendly feeling, and mutual helpfulness between the members of the profession, individually and collectively, and the State Board. The Board exists as the representative of a law of the State. The law was enacted for the primary purpose of protection to the people of the State from unqualified or disreputable practitioners of dentistry. It was put in form and force to insure as far as possible that good and efficient services should be rendered to the people. The State assumes, however, that the intelligent members of the dental, as well as those of the medical, legal or any other profession, are best qualified to establish educational requirements, with rules and regulations for their enforcement. Therefore the members of the Board are selected and appointed from the list of dental practitioners.

It is a fact recognized by the intelligent public, that the true character and standing of any man *is known best by the members of his own profession.* Whoever is distrusted by them is distrusted by the people wherever the fact is known. It follows, therefore, that public opinion as relating to any profession depends chiefly upon the individual and associate influence of the members of that profession. Each individual member exerts an influence favorable or otherwise to the standing of his profession just so far as his acquaintance extends. But his sphere of individual influence is limited.

When, however, the members of any profession associate themselves in proper manner and spirit, their associate influence is felt throughout the whole field covered by the membership—often much further.

Never before in the history of the world has the power of associated effort been so great as now. It is one of the *greatest facts* of the present time. With nearly every interest, in every field of effort, it has apparently come to this—associate—*stand together or go backward; associate or be overswept; associate or die.*

All great movements, political, industrial, religious, mean but this. Association has become the rule not only of neighborhoods,

towns, cities, counties, states, nations, but in recent years *International.* The whole earth is becoming impacted by association. We have seen the spirit of an International Peace Congress, represented by an American President, sweep half round the globe and end the bloodiest of wars.

Recently in Los Angeles there were seen men from every continent and quarter of the globe, men of every color and race, in the world's General Conference of the Methodist Church. The reflex power and influence of that conference cannot be measured. Not long before that in the same city was held a National Convention of School Teachers and the power of that meeting for good over this land, who can tell? These are but examples—world conventions are becoming frequent and held as a matter of course. What does it all mean? It means the recognition of a principle long ago formulated, *"In Union there is Strength."*

Now to apply these truths to ourselves. We have a dental law which we believe to be essentially good. Like any other law its value depends on enforcement. As in all other cases enforcement must depend largely upon a favorable public sentiment, and public sentiment as before stated with reference to any profession and their related interest to it, depends upon the organized, associate, educational influence of that profession.

The medical profession of the United States has just awakened to a new realization of this idea. The National Association has appointed and salaried a man who is going from State to State arousing medical men to effort and association. In consequence of organization, by communities, counties and states, things have been done that seem almost miraculous. For example—in the county of Larue, Kentucky, the county wherein Abraham Lincoln was born, a small and comparatively poor county, with not a town of over seven hundred inhabitants within its borders, and only twenty-six physicians, note what has been accomplished.

The twenty-six physicians were of different schools—Regular, so-called, Homœpathic and Eclectic. They decided to ignore all differences and get together for mutual improvement. They stopped quarreling and saying mean things of each other. They came together, got acquainted, and became friendly. They organized a post-graduate course of study and held meetings twice

a month or oftener on call of the president. They had dinners together; papers, discussions, and case reports following, with exhibition of pathologic specimens of interest.

Result—The members of that county organization in due time developed expert skill. Soon they were performing nearly every operation known to surgery; at every operation of importance the others were invited to assist or to witness the work.

At times the association had dinners to which they invited men of other professions, ministers, lawyers, editors, teachers, with some discussion of general interest following. Good understanding, mutual respect, effective solidarity of the chief sentiment making elements of the community were thus brought about. Today there is not one advertising or otherwise disreputable practitioner in that county. The medical profession has the confidence of the people because the members have shown themselves worthy. They have risen to the high level of genuine manhood by honest, kindly association.

Example two—The dentists of Illinois. Twenty-five years ago there was scarcely a local organization of dentists in this State outside of Chicago. There was the State Society, excellent but few in numbers. Through its influence, however, a dental law was passed. For more than twenty years the organized influence of dentists was insufficient to secure a new law or wholesome amendment of the old one. But from time to time new local societies were formed and their benefit came to be recognized. Now within the last two years, under the leadership of energetic men, societies have been formed that include every city, town and county in the State. In some regions where there are no considerable cities, two or more counties have been merged into one organization. *But every part is covered by effective local organization.* And the work done does not stop here. Every membership of the local society carries with it by one payment of dues full membership also in the State Society. The whole body of the profession is thereby made a unit. The membership of the State organization has been multiplied by seven within two years; an army of 1,500 men of one mind and purpose are touching elbows. Their force is irresistible. A new law has been enacted, and every disputed point fought through the courts successfully.

In Chicago, by the fusion of two rival associations they have been able to have the greatest clinics the world has ever seen—it is not unusual for 250 or 300 to be present at one of their monthly meetings. By the simple power of association with fraternal feeling, Chicago has been made the greatest dental center of the world.

With these facts and examples before us do we need to have our lesson interpreted? Is it not plain that "He who runs may read."

First—There ought to be the organization of dentists in every county in the State.

Second—There should be local organization in every city of 5,000 or more inhabitants, or in any region where a number of towns are accessible to each other. Of these societies, every licensed dentist should be a member.

Third—It should be the primary object of the society to build up the professional character of its members. To make them liberal, charitable and patient with each other's faults—for no one is faultless. Also to increase the knowledge and skill of each member by interchange of thought and clinical demonstrations.

Fourth—It should be the aim of every society to promote in all right ways the education of the people as to the value of teeth and their preservation, especially the teeth of the young.

Fifth—To bring into closer relation physicians and dentists to their mutual advantage.

Sixth—Every society should be in touch with the State Board of Examiners. The secretary of the city or county society should inform the secretary of the Board of all arrivals, removals, and deaths of dentists that come to his knowledge within his district, in order that the records of the Board may be kept as perfectly as possible.

Seventh—It would be legitimate and right to publish in local papers a correct list of licensed and registered dentists of a given county or city, for the information of the public, so that the people may know who are acting in obedience to law and who are not. As it is now, not even dentists themselves are well informed, as a rule. A safeguard of right is open knowledge—*publicity*.

The State Board exists by the law, and for the enforcement of

the law. It stands for the protection of all the people, including dentists who conform to the law. *But to make its work effective, associations must help, and public sentiment must favor.* Once understood, all right interests are one, and the key to success lies in organization. Lay aside bickerings, jealousies; forget differences; make no gossip; let the nobler spirit rule. Get together.—*Pacific Dental Gazette.*

WANTED!—A PATHOLOGIC SENSE. By James Truman, D.D.S., Philadelphia, Pa. The average practitioner would naturally consider this sense a superfluous want in dentistry. The lowest man in the dental college class is supposed to have a knowledge of the importance of pathology in connection with his specialty. While this is true, the man with a clear pathologic intuition is seemingly a rare production in our ranks, if we are to judge by the serious mistakes presented in almost every line of dental operations.

To observe the average practitioner at work it would seem as though the great effort was to gain time for other operations and to get rid of the patient as quickly as possible, regardless of the pathologic sequelæ that may result.

The operative man intent on finishing his fillings has no thought of the many things that might happen to his patient as the result of his excavating and drilling. The "extension for prevention" absurdity has taken such a deep hold on some minds that they will proceed to cut a pinhead cavity to the limit of the boundary of the approximal surface, and then, not satisfied, will begin to remove about half the sulci of the occlusal surface. They have no memory for the histologic fact that they are removing a large portion of the enamel shield and substituting therefor a metal conductor, irritating through thermal shocks the cut ends of the protoplasmic contents of the tubes, and inviting thereby subsequent irritation and ultimately congestion of the pulp, possibly. The patient complains of pain on taking hot and cold drinks, but the soothing answer comes that it will soon quiet down, and it does, but in the majority of cases the quiet means that the pulp has died. Have operators the privilege of thus abusing and deceiving patients?

Again, under the same dictum from high authority, the operator will cut away the cervical border of the tooth, removing all the remaining enamel, tearing away the pericemental membrane, all the cementum, and forming a cavity in the dentin. He has accomplished two processes of disturbance here: one, the irritation of the pericemental membrane, inviting bacterial invasion; and the other, irritation from the metal in contact with the peripheral ends of the dentinal tubes. There still remains a third: he has created a pocket for the collection of organic matter, the development of pathogenic bacteria, and eventually the possibility of pyorrheal conditions and recession of the gingivæ. Is this the best work dentistry can perform in this the twentieth century?

The cry has gone out, "The pulp is no longer of any value in the conservation of the tooth," and right and left men are destroying pulps in healthy teeth under various pretexts. The man who teaches that the pulp has lost its function from old age—which may not be defined by years—is not educated to the standard of the modern dental curriculum. The loss of the pulp means the death of two-thirds of the tooth. The remaining third may be made up of the enamel—which in my opinion loses its slight remaining hold on vitality by the loss of its nervous connections—and the cement, the latter being constrained to contend with dead bone (dentin) on the one side, and an overworked membrane, from which it receives its nutrition, on the other. Eventually in after years the tooth gradually becomes unable to resist environmental influences, and rapidly degenerates and disappears. The dentist then congratulates himself that years have supervened since he operated, and it is therefore no fault of his that that tooth has gone the way of all humanity.

Then the "bridge worker" begins when the operative dentist has completed his work. He must have an abutment, or two of them, but as two are not always available, one must subserve his purpose. If it be a bicuspid, he makes a peg of it and then crowns it with gold. He may or may not have devitalized the pulp (he will call it the "nerve,") but that is immaterial, as he is indifferent to any immediate suffering of the patient. If it be a molar in the lower jaw, he has learned by experience that the grinding off of the enamel means eventu-

ally the death of the pulp, so that organ is at once devitalized. He then undertakes to make it good by removing the dead pulp. He cannot do this effectively in the anterior canals, so consoles himself with the reflection that it will be a long time before abscess sets in, and a "bad cold" will, in any event, cover his sin of omission and commission.

I have in view one case in which a lady sought my advice in regard to a bridge on the lower jaw, to be attached to a cuspid. It was demonstrated to be impossible. If it ever was attempted it would result in serious pathologic disturbance. At my suggestion she consulted one of the best bridge workers in the United States, and he confirmed the view given. She, however, went to another; the bridge was made and for a year or more it remained confortable; then began very serious pathologic trouble, medical attendance, great suffering, and final loss of the bridge. Is this an unusual type?

The cry has gone abroad, "Shall it be whole bands or half-bands?" A few even will be heard insisting on no bands. Nature is very kind, and will permit average ignorance to meddle at will with the tissues of the body. No other reason will explain the occasional tolerance permitted in the case of bands and half-bands. By all the laws of which we have any knowledge a band should sooner or later cause the destruction of the pericemental membrane. For reasons already alluded to, on cutting below the cervical border there is every opportunity here given for the development of pathogenic bacteria with their irritating toxins, with the result that an artificial pyorrheal pocket is established. It is only a question of time, in my opinion, when all teeth so treated will be lost. It is therefore not a question of whole bands or half-bands, but *all* bands should be relegated to the scrap-heap.

It may be a subject for inquiry whether the average dentist ever considers his patient when he rams the clamp down on the pericemental membrane; or whether he ever takes a thought of how it feels when he gives an extra twist to the ligature. Neither does he regard the effect of time—as to what, after a couple of hours of torture, may be the subsequent result. He forgets that he may have started a pathologic border upon that tooth eventually to end in its destruction. How many, may it be asked, take

the precaution to use antiseptic measures after each operation? The answer must be left to the conscience of each individual. The dental world of 1850 knew very little of pericemental lesions, certainly not from clamps, ligatures, separators, etc.

The Editor of the *Dental Cosmos,* in an editorial article July, 1906), in quoting the writer of this essay in regard to the latter having contended, in a previous article, that the good men of 1850 taught the same methods in shaping cavities as the modern exponents of "extension for prevention," goes on to explain the difference—viz., that "The good men of 1850 may have known how to shape and fill cavities, but the good men of to-day know why, and the difference between the how and why, in this case at least, is just the difference between empiricism and science."

The Editor would find few to object to this, but if the good men of 1906 know not only the how but the why, then the majority in the dental profession in this twentieth century are to be condemned, and all, including the Editor of the *Dental Cosmos,* if he practices as he preaches, are to be ranked with those who, having received the light of the new dispensation, prefer to walk in paths that lead physiologically and pathologically to the injury of patients and to the discredit of the dental profession.

In five minutes it is impossible to enumerate all the possible lesions that the dentist may and does produce. It seems to the writer to be time to sound the note of warning, and plead for a broader intelligence in all that concerns the entire human organism. Partial culture in dentistry is a thing of the past, or should be, but with thoroughness must be inculcated a power to think. I repeat, therefore, that what is most demanded in dentistry to-day is not a higher entrance qualification or a broader curriculum, but an ability to grasp the essentials of disease, to follow from cause to effect—in other words, to cultivate a pathologic sense that may enable the operator to mentally grasp with clear prescience the results that may follow all the operations we are called upon to perform, and the influence that these may exert upon the entire organism.—*Dental Cosmos.*

A METHOD OF REPAIR THAT CAN SUCCESSFULLY BE APPLIED TO SOME CASES OF FRACTURED BRIDGE OR CROWN FACINGS. By Herbert H. Bethel, A.M., D.D.S., Philadelphia, Pa. A case once presented itself in my practice in which circumstances rendered it inexpedient for me to remove a piece of bridge work in order that two bicuspid facings which had broken off might be repaired. The bite was such that it would not admit of any extra metal linguo-occlusally, and the backings were so thin that I could not hope to use such a method as Zentner's riveting or Bryant's screws and nuts.

I may say here that the facings had broken out on account of too thin a backing and exposure of the facings to a very heavy bite.

Realizing that I could not employ any of the usual methods, I thought out the following, which may be in use by many, although I had not before heard of it, and a claim to originality is of less moment than the usefulness of the idea.

I trimmed the old jagged backing and bent it with pliers until I had nothing more to fear from the bite. Then I straightened the pins, and filed the little heads up, so that they were of the same gage as the pin. Of course, in cases in which the pins in soldering have been crystallized, and snap off in the porcelain, this method cannot be employed. The pins must be intact after the remaining chips of broken facing have been cleared away.

Now prepare to bake porcelain-inlay facings. A matrix is needed. This can be burnished directly on the bridge, or a dental lac or modeling compound impression taken and the matrix burnished to the model. I can suggest but two methods to obtain the holes in the porcelain facings so as to allow the new facing to fit down over the pins:

(1) Take platinum tubing that fits accurately over the pins. Cut off little pieces a trifle longer than the pins, and pinch this trifle in the pliers while the tube is still on the pin. This closes the one end of the tube. See that the tubes, two to each tooth, come readily away from the pins. Now burnish the foil—either No. 30 gold for low-fusing or 1-1000 platinum for high-fusing body—to the old backing and the gum, allowing the pins to puncture it. When well burnished replace the little tubes, and with yellow beeswax—as hard as it can be worked—remove the matrix and tubes together. Carefully, and without disturbing the position of the tube in the

wax, slip steel pins one-fourth to three-eighths of an inch in length into the tubes and pour the impression with powdered asbestos 2 parts, plaster of Paris 1 part, engaging the protruding pin ends. The pins should be selected beforehand and should accurately fit the tubes. Coat with moistened whiting the end that goes in the tube. Dry the cast gently, remove the wax by dry heat and cotton fiber, and bake on the porcelain body in such a way as to avoid drawing the tubes away, and contour carefully at the cervix.

(2) This method is similar to the first in the general method of procedure, except that instead of platinum tubes, gold-wire pins a little heavier than the tooth-pins are baked in the new facing. These pins of pure gold are slipped into the wax impression through the punctures in the matrix, no tubes having been used in the procedure.

The pins are long enough to be held by the investing material, and are afterward cut off and with the engine bored out of the porcelain. As the gold is so soft, this can be readily accomplished. Set the facings with cement as carefully as for an inlay, roughening the pins, backings, and back of the facing. Protect well while the cement is setting.

If the bite is judiciously handled, the work will be successful and although the account is somewhat lengthy, the method is really a very easy one to a man accustomed to working with porcelain.—*Dental Cosmos.*

METHOD OF CONSTRUCTING CROWNS FOR THE ANTERIOR TEETH. By Chester A. Baker, D.D.S., Washington, D. C. My idea is to do away with the band on the labial portion of the root, when crowning the anterior teeth. The Richmond crown has a band passing around the entire circumference of the root just under the free margin of the gum, and it is the anterior portion of this band which is objectionable, causing recession of the gum, etc. The principal feature of my method is a notching mesio-distally of the anterior face of the root about half way anteriorly to the root-canal opening. (Fig. 1.)

The root is first prepared in the same way as for the ordinary Richmond crown, and then the notch is cut. A piece of 24-karat gold about No. 32 gauge is then soldered to a platino-iridium post, placed on the root, and burnished first to the notched sur-

face. (Fig. 2.) It is then removed and that portion stiffened with solder. The portion covering the posterior surface of the root is then split so as to allow the surplus gold to be turned up and burnished, thus forming the band. (Fig. 3.) After the cap has been thoroughly burnished to the root, it is removed and invested in a little whiting, and solder is flowed so as to stiffen it and also to reinforce the portion which forms the band. (Figs. 4 and 5.)

By this method all the advantages of a full-banded crown are

FIG. 1.

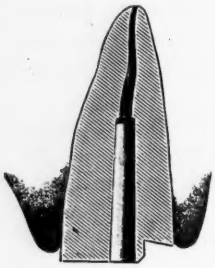


FIG. 2.

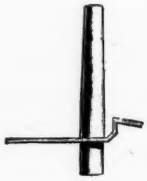


FIG. 3.

FIG. 6.

FIG. 4.

FIG. 5.

available, and the disadvantage of gold showing above the porcelain on the anterior portion of the root is obviated. The operator can thus form a cap which absolutely fits the face of the root and to which a facing can be attached as in the ordinary Richmond crown. The notch across the face of the root may be cut very easily with a sharp inverted-cone bur. The cap may be made of platinum and the rest of the crown completed with porcelain in the usual way.—*Dental Cosmos.*

The Dental Digest.

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At 2231 Prairie Avenue, Chicago,

Where All Communications Should be Addressed.

Editorial.

APATHY IN OUR RANKS; ARE THE YOUNG MEN DOING THEIR FULL DUTY?

In this issue of the DIGEST, page 1058, there is reprinted a brief, well written, and well meaning article from the pen of Dr. S. H. Guilford of Philadelphia, in which he summarily takes the young men of the profession to task for not doing their full duty towards the advancement of dentistry.

The article reads: "Among the younger practitioners of to-day there seems to exist an apathy or lack of desire to make some return for the rich heritage of the past. Once out of college, they bend every energy to the acquirement of a practice that shall fill all the hours of the day, and this accomplished, they rest content and feel that they are fulfilling all of life's mission. They lack ambition to lead a higher professional life by contributing to the general professional welfare in the way of mental effort or self-denying labor. Their horizon appears to be bounded by the four walls of their offices, and they are unwilling to devote their evenings to scientific research and literary effort in the line of their vocation, or to civic or humanitarian work outside of it. By thus confining themselves to routine professional work, they cease to broaden and develop as they should, and this gives the world occasion to stigmatize us as 'narrow.'

"We are speaking of the masses, not the exceptions, for among the latter there are those who do their part as best they can in local and general society work, on dental examining boards, and sometimes in the colleges. Some few pursue a special line of re-

search or experimental work, and embody the results obtained in valuable contributions to professional society literature; but these are not many when compared with the membership of a profession such as ours.

"College chairs to-day are filled largely by men who came upon the scene when dentistry was young, and journals are edited and books written by men past middle life. Who are to take their places when the day of retirement comes? Are the younger men of the profession preparing themselves to step in and carry forward the good work? We wish we could answer affirmatively, but we cannot. It is really a matter of great concern, for these places must be filled, if not by the qualified, then by the unqualified."

This condition of affairs, if but true in part, is really appalling, and should be thoroughly and convincingly brought to the minds of the younger men. They should be awakened from their apathy that they may do all within their power to broaden the horizon of dentistry.

The writer, however, is firmly of the opinion that this seeming apathy is not the peculiar characteristic of the majority of the young practitioners who are yearly flocking to our ranks and who are gracing our profession. It takes time and money, as well as energy, ambition and brains, to do scientific work of any character and make it of practical value to the profession. The average young man, when he enters upon his professional career, having spent three or more years in college, finds himself face to face with the knotty problem of building a practice, and this, in most instances, with a small bank account to his credit, if any at all; and, therefore, he is necessarily forced to exert his first efforts in this direction. Should he be censured for this? Not at all; but, on the contrary, he should receive the hearty support and advice of the older and well established practitioners in the vicinity where he locates, to the end that his practice will be built along moral and ethical lines.

It is also the opinion of the writer, based on experience and observation, that the older practitioners have not always done their full duty towards young men in extending this support, and in seeing that their names are enrolled as members in the local and

general societies. When a concerted effort was made in Chicago and the state of Illinois to reorganize the local and state societies, it was the common experience for the committee on membership to find many young men ready and anxious to join who had simply been waiting since their graduation for an invitation. Many had felt that these societies were for the select few, and that it was difficult to gain membership therein.

A few years ago, the Governor of the State of Illinois justly vetoed a dental bill, simply because the bill provided that the majority of the members of the State Board of Dental Examiners should be appointed by the State Dental Society—an organization, which, at that time, had a membership of only about nine per cent of the practitioners of the state. This society, composed largely of the older men in the profession, recognized its apathy and began to reorganize; young men gladly came in, and in one year the society had enrolled as active members over fifty per cent of the reputable dentists of the state, as a result of which there was no difficulty in securing subsequently the passage of a good dental law.

The duties of the older men do not cease, by any means, when they cause to have enrolled in the local and general societies the names of the younger men. There has been the complaint on the part of the latter that the results of their labors, when presented to the societies, are often not as charitably received as they should be. How well this complaint is founded I am not prepared to say. I do know, however, that, in most cases, the spirit of debate on the floors of our dental societies to-day is carried on in a friendly and gentlemanly manner; and no young man should permit his enthusiasm to be dampened because he has been criticised. In the final analysis of things, right generally prevails; and just criticism paves the way for future advancement and progress.

There never was a time in the history of the profession when young men had better opportunities offered them than they have to-day; and the writer firmly believes that there never was a time when young men were more alert to their professional duties, and were doing more for their profession, than they are at the present time. Young men to-day are taking advanced steps in every walk of life. We find them as leaders in society, politics

and business; and this is no less true of our own calling. When vacancies were made in our ranks by the death of Barrett, Essig, Taft and other leaders—vacancies most difficult to fill—who but young men took up their work with energy and zeal and are carrying it forward with credit to themselves and honor to their profession? What could be more broadening in its influence than to have cultured young men, members of the dental profession, leaders in social, fraternal and civic organizations? This we see to-day in almost every city of our land; and as a result the profession of dentistry is receiving favorable comment almost daily in the public press.

That apathy exists within our ranks there can be no doubt in the mind of the careful observer; but it cannot all be traced to the younger element of the profession.

Let us all join hands, old and young, and work together in harmony for the advancement of our noble calling; remembering that harmony is the force which moves the world, and without which no organization, whether professional, social, political, or what not, can hope to achieve its greatest success.—J. P. B.

Notices.

NORTHEAST MISSOURI DENTAL CLUB.

The Northeast Missouri Dental Club will hold its fourth annual meeting at Kirksville November 11 and 12, 1907. Dr. Arthur D. Black of Chicago will be present and contribute to the features of the program.

J. L. BRIDGFORD, President, Macon, Mo.

COUNCIL BLUFFS (IOWA) DISTRICT DENTAL ASSOCIATION.

The Council Bluffs District Dental Association was formed August 31, 1907, and the following officers elected: President, Horace Warren, Missouri Valley; Vice-President, G. Roscoe Miller, Atlantic; Secretary, Dr. MacCall, Council Bluffs; Treasurer, R. D. McEvoy, Missouri Valley.

STATE OF CONNECTICUT DENTAL COMMISSIONERS.

The Dental Commissioners of the state of Connecticut hereby give notice that they will meet at Hartford on Wednesday, Thursday and Friday, November 6, 7 and 8, 1907, to examine applicants for license to practice dentistry, and for the transaction of any other business proper to come before said meeting.

All applicants should apply to the recorder for proper blanks and rules

for conducting the examination. Application blanks must be filled in and sworn to, and with fee, filed with the recorder on or before November 1, 1907.

By order of Commission.

GILBERT M. GRISWOLD, Recorder,
783 Main St., Hartford, Conn.

NEW JERSEY DENTAL SOCIETY.

At the thirty-seventh annual convention of the New Jersey State Dental Society, held at Asbury Park July 19, 1907, the following officers were elected: President, Walter Woolsey, Elizabeth; Vice-President, Frank Gregory, Newark; Secretary, Charles A. Meeker, Newark; Treasurer, H. A. Hull, New Brunswick. The next meeting will be held at Asbury Park.

NORTHERN IOWA DENTAL SOCIETY.

The thirteenth annual meeting of the Northern Iowa Dental Society was held at Sioux City September 4, 5 and 6, 1907, and the following officers were elected: President, C. N. Booth, Cedar Rapids; Vice-President, H. P. White, Sioux City; Secretary, J. W. Kelley, Mason City; Treasurer, W. G. Crandall, Spencer. The next meeting will be held at Clear Lake.

MARYLAND STATE BOARD OF DENTAL EXAMINERS.

The Maryland State Board of Dental Examiners will meet for examination of candidates for certificates November 6 and 7, 1907, at the Dental Department of University of Maryland, Baltimore, at 9 A. M.

For application blanks and further information address

F. F. DREW, Secretary,
701 N. Howard St., Baltimore, Md.

NEW JERSEY STATE BOARD OF REGISTRATION AND EXAMINATION IN DENTISTRY.

The New Jersey State Board of Registration and Examination in Dentistry will hold their semi-annual examination, beginning Monday, December 9, and continue through the 10th and 11th. Practical operating and practical prosthetic work, beginning at 8 A. M. Monday, December 9. Photograph and preliminary credentials must accompany the application. Meeting, State House, Trenton, N. J. For full information inquire of the Secretary, Charles A. Meeker, 29 Fulton street, Newark, N. J.

MINNESOTA STATE BOARD OF DENTAL EXAMINERS.

The next regular meeting of the Minnesota State Board of Dental Examiners will be held in Minneapolis at the Dental Department of the State University on Tuesday, November 12, 1907.

All applications must be in the hands of the secretary by October 29, 1907, accompanied by the fee of $10. Examinations will be begin at 10 o'clock sharp on the following subjects: Anatomy, physiology, chemistry, materia

medica and therapeutics, metallurgy, histology, pathology, oral surgery, orthodontia, operative and prosthetic dentistry. The practical examination consists of the preparation of a cavity and the making of a gold filling or the preparation of a root and making of a crown or both for a patient supplied by the board.

All instruments and materials necessary to perform the required operations must be brought to the examination by the applicant. A diploma from a recognized college must be shown. Any further information will be gladly furnished by Dr. George S. Todd, Lake City, Minn.

THE COMPONENT SOCIETY OF THE THIRD CONGRESSIONAL DISTRICT, A BRANCH OF THE LOUISIANA STATE DENTAL SOCIETY.

The Component Society of the Third Congressional District, a branch of the State Dental Society, was organized at Morgan City August 18, 1907, and the following officers elected: President, S. J. Bourgeois, Morgan City; Vice-President, R. L. Zelenka, Houma; Secretary-Treasurer, E. J. Cherault, Morgan City. Executive Committee—E. C. Berwick, Franklin; O. J. Braud and J. J. Daigre, Thibodaux; J. R. Oliver, St. Martinville; Paul J. Cyr, Jeanerette.

MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

OFFICE OF THE SECRETARY, 25 Merrimack Street, Haverhill, Mass.

A meeting of the Massachusetts Board of Registration in Dentistry, for the examination of candidates, will be held in Boston, Mass., October 23, 24 and 25, 1907.

Candidates who have applied for examination will report to the Secretary Wednesday, October 23, at 10 o'clock A. M., at Harvard Dental School, North Grove street, and come prepared with rubber-dam, gold, plastic filling materials and instruments, to demonstrate their skill in operative dentistry. Any one who wishes may bring his patient. So far as possible patients will be furnished. The Board in every instance selects the cavity to be filled. Partially prepared cavities never accepted.

The theoretic examination—written—will include operative dentistry, prosthetic dentistry, crown and bridge work, orthodontia, anatomy, histology, surgery, pathology, materia medica, therapeutics, physiology, bacteriology, anesthesia, chemistry and metallurgy, and will be held at Civil Service Rooms, State House, from Thursday, October 24, at 10 A. M., until Friday afternoon, October 25.

All applications, together with the fee of $20, if first examination, must be filed with the Secretary of the Board on or before October 16, as no application for this meeting will be received after that date.

Hereafter candidates for second and subsequent examinations will be required to fill out an application blank and forward it to the Secretary as above.

Every candidate for examination must be twenty-one years of age.

Application blanks may be obtained from the Secretary.
Temporary licenses are never granted.
The fee for third and subsequent examinations is $5.

G. E. MITCHELL, D. D. S., *Secretary.*

LATEST DENTAL PATENTS.

858,193. Dental chairs, Logan L. Mallard, Atlanta, Ga.
858,827. Securing dowel-pins in artificial teeth, Joseph Ramsperger, of York, Pa.
858,828. Artificial tooth, Joseph Ramsperger, York, Pa.
858,914. Dental mallet, George H. Shannon, Cambridge, N. Y.
859,333. Fastening pins in artificial teeth, Joseph Ramsperger, York, Pa.
860,107. Tooth-brush, Theodore Reminger, Tiffin, Ohio.
860,394. Revolving tooth-brush, Nathan Levin, St. Louis, Mo.
860,435. Tooth-brush, Ted H. Bangs, Albuquerque, N. M. Ter.
860,527. Tooth-brush, James A. Cochrane, Cincinnati, Ia.
860,555. Dental-syringe attachment, William C. Middaugh, Easton, Pa.

News Summary.

JOHN TRACY, a dentist of Louisville, Ky., died in that city Aug. 27, 1907.

CECIL H. GREEN, 32 years old, a dentist of Middleton, Pa., died Sept. 6, 1907.

DR. BONIFIELD, a dentist of Zanesville, O., died from heart failure Aug. 29, 1907.

FRED A. WALLS, 56 years old, a dentist of Millington, Md., died Aug. 30, 1907.

C. GEORGE LANAUX, a dentist of New Orleans, La., died at Paradise, Ariz., Aug. 27, 1907.

ALFRED J. BROWN, a dentist of Baltimore, Md., died from Bright's disease Aug. 21, 1907.

G. E. DOUGLAS, a dentist and early settler of Hastings, Neb., died from pneumonia Sept. 9, 1907.

MARSHAL B. AYRES, 36 years old, a dentist of Dubuque, Ia., died after a brief illness Sept. 8, 1907.

SAMPSON W. HARRIS, JR., 34 years old, a dentist of Carrollton, Ga., died from apoplexy Sept. 4, 1907.

JAMES W. BLACKBURN, 29 years old, a dentist of Jewett, O., died from typhoid fever Aug. 29, 1907.

HOMER REX WHITNEY, 22 years old, a dentist of Battle Creek, Mich., died of typhoid fever Aug. 10, 1907.

F. A. LANGE, 39 years old, a well-known dentist of Salt Lake City, died from Bright's disease Sept. 7, 1907.

BYRON EASTMAN, 25 years old, a young dentist of Boston, Mass., died from spinal meningitis Aug. 13, 1907.

EDWARD C. KENNON, 23 years old, a dentist of St. Louis, Mo., died from injuries received in an automobile accident Sept. 7, 1907.

MILTON F. LENOX, 50 years old, a prominent dentist of St. Paul, Minn., dropped dead in his office from heart failure Aug. 23, 1907.

DENTIFRICE.—Dentists prefer woman patients because a woman is naturally inclined to keep her mouth open.

ALL ON THE OTHER SIDE.—Dentists are about the only people who do not suffer when they hunt for trouble.

Up to a few years ago the dentists of Japan pulled teeth with their fingers. Forceps and other instruments are now being generally used.

THIS EPITAPH HAS BEEN SUGGESTED FOR A DENTIST'S MONUMENT: "View this gravestone with all gravity; Below I'm filling my last cavity."

CRESOL.—(Cresol.) A mixture of the three isomeric cresols obtained from coal tar, freed from phenol, hydrocarbons, and water.—U. S. P., 1900.

ONE DAY A YOUNG MAN FROM DULUTH had a deuce of a pain in his tooth. He was told to take gas and the pain would all pass. It passed—so did he—through the roof.

COMPLIMENT.—"How do you like the new dentist?" "Oh, isn't he complimentary? He seems to admire my mouth so much. He says it is just the kind he likes to see."

DENTIST COMMITS SUICIDE.—Dr. W. E. Cain, Jr., of Houston, Tex., committed suicide in Palestine on August 21 by taking strychnine. A love affair is assigned as the cause.

A CHICAGO MAN SUFFERED A DISLOCATION OF THE NECK WHILE HAVING A TOOTH PULLED.—Here is another thing to think about when the dentist tells you to open your mouth.

FATALITIES.—A young girl of Chicago expired shortly after having several teeth extracted. Weakness from hemorrhages, with other complications, it is thought, caused her death.

JUST AS BAD.—Victim: You told me these false teeth would be just as good as my natural ones, and they hurt me fearfully. Doctor: Well, didn't your natural ones hurt you?

FIRES.—Dr. Cochrane, Columbus, O., Aug. 18; loss, $100.—Dr. Charles P. Barton, Spencer, Mass., Aug. 21; loss, $1,000.—Dr. Carl B. Miller, Cedar Falls, Ia.; loss, $2,000; insurance, $550.

BIG DENTAL FILLING STOLEN.—A woman dentist recently stopped with gold a hole in the tusk of a circus elephant at Innsbruck, Germany, but a few nights later the filling, worth $70, was stolen.

BE CHEERFUL.—The dentist of today, as well as the dentist of tomorrow, should be a happy, cheerful, contented man if he expects to be a successful dentist. Downcast feelings and a pessimistic view of things are not calculated to make a man put forth his best efforts. And unless we do put forth

our best endeavor we will not be successful.—Dr. E. F. Hazell, *Dental Review.*

The Hardest Part.—Friend.—"What part did you find most difficult when you first began practice?"

Dentist.—"Trying to live up to the income I told my friends I was making."

A Washington (D. C.) man blacked the eye of the dentist who was trying to pull his tooth. Millions of people have been prompted to do the same thing, but it is only now and then that one is found who has the courage to take such an initiative.

The United States Pharmacopeia.—It is our duty to become familiar with this valuable book—a volume that is considered by high authority as "an epoch-making book," and as the best pharmacopeia in the world. It is also the legal standard in most of the states.

Keep Good Company.—The old adage, "Boys are judged by their company," holds good in professional life as well. The more we associate with good men the better professional men we become; and nowhere will you find the good so abundant as in societies.—Dr. F. A. Dillie, *Dentist's Magazine.*

Dental Society Dispensary Work.—The report of the free dispensary of the Rochester Dental Society for August shows 79 patients treated; 282 operations performed; amalgams fillings put in, 109; cement fillings, 38; guttapercha fillings, 17; roots filled and teeth treated, 29; miscellaneous operations, 89.

Cause of Failures in Inlays.—Many of the failures of cemented fillings or inlays are due to indifference in the operation of cementation. One of the advantages of large inlay restorations, as compared with crowns, is that the rubber dam may be applied, the tooth thoroughly dried and kept dry until the cement has thoroughly crystallized. A slow-setting cement is always preferable.—Dr. S. H. McAfee, *Dental Cosmos.*

Broaden the Scope of Dentistry.—The dentistry of today is not the dentistry of the past. It is, and should be, more earnest in its endeavors to apply preventive treatment to the various pathologic conditions that appear within the mouth than it is to repair them with a perfected technique. The necessity for broadening the scope of dentistry beyond its mere mechanical accomplishments has arrived, and treatment of systemic symptoms that have a direct bearing on oral conditions, and the general health as well, must be met with a comprehensive knowledge of pathology and general medicine.—Dr. T. J. Barrett, *Dental Cosmos.*

Barber Dentists Pull Teeth.—Consul E. L. Harris at Smyrna has reported to the state department that extraction is the sole remedy for toothache in that locality and that barbers are generally the only operators at such times. He adds that at present the number of dentists in Smyrna is very large, although few of them have a scientific training. He suggests that an American dentist might do well there. His record at the state department does not take into consideration his own physical disabilities, but it is suspected

that Consul Harris is either afflicted or expects soon to be afflicted with trouble with his teeth.

IMPORTANCE OF MASTICATION.—There is no function of the body that is of greater importance, or that influences all other functions to the extent of proper mastication of food; and it is reasonable for the one interested in this line of work and that to assume that proper food properly masticated is the all important in preventive medicine; and by keeping the body in condition it can resist disease.—DR. F. A. DILLIE, *Dentist's Magazine.*

EVERY MAN HIS OWN DENTIST.—Everyone will be his own dentist within a short time and will be able to pull his own teeth without pain, according to Dr. Tunnock, a dental surgeon of Australia, who has petitioned King Edward for royal support to a new anesthetic which he has invented. Dr. Tunnock says his invention so softens the bony walls around the teeth that they may be extracted without pain and that sufferers can pull their own teeth.

NEW ERA IN OPERATIVE PROCEDURE.—The subject of gold inlays is now attracting more attention, perhaps, than any other before the profession, and with its further development and perfection, together with that of porcelain fillings, we will be on the verge of a new era in operative procedure. The cemented-in filling is, even now, marking the passing of extensive cohesive and non-cohesive gold and amalgam operations, and has greatly lessened the need of crowns.—DR. S. H. MCAFEE, *Dental Cosmos.*

NEGROES FORM NATIONAL ASSOCIATION.—There are now enough negro doctors and dentists in the country to form a national association. This Association met recently in Baltimore and observers pronounced the members not appreciably behind white practitioners in culture and professional equipment. There are 2,000 negro doctors and dentists in the country and a thousand more are on their way through the professional schools. It is said that they earn twice as much on the average as a negro lawyer or preacher.

FINDS A SEVEN-INCH TOOTH.—Jacob Hochstrasser of Kane County, Illinois, made a remarkable discovery of mastodonic remains upon his farm. He found four enormous teeth and a large number of bones, sufficient to fill a bushel basket. One of the teeth measures seven inches in length and eighteen in circumference. Among the bones in his possession are those composing the head of the animal. One bone weighs ten pounds and contains a portion of a tusk. The finder is willing to turn the bones over to any college desiring to exhibit them.

"METALLINE CARVING COMPOUND.—To make a crown without the use of the articulator after the band has been fit to the tooth, leaving space between the band and occluding tooth, warm a piece of Metalline Compound over a Bunsen burner or alcohol lamp, kneading it gently between the thumb and finger, cut off enough of the soft Metalline Compound to form cusp, place it on the band, have patient bite into the Metalline, remove band and carve into shape. If the tooth is broken away badly, warm a piece of Metalline, fill the band flush with edge of band and cut off smooth, place a piece of tinfoil on band

and add Metalline to get the bite. This is done to keep the parts from adhering. Then remove the cusp from the band and trim and sandpaper the back to get the surface flat. Place it on a metal slab, placing the rubber ring around it, and pour on fusible metal and you will get the most artistic and practical result, as the cusps, when swedged, will exactly fit the band and articulate perfectly.—Dr. L. P. Davis, *Western Dental Journal.*

Baby Has Teeth at Birth; May Become Rival of Roosevelt.—An infant son born to Mr. and Mrs. I. E. Coddier, Mishawaka, Ind., September 10, is likely to become as famous for his teeth as President Roosevelt. The attending doctor and nurse, when looking at the infant, were amazed to find that it was already provided with eight teeth, four in the upper and four in the lower jaw. They were protruding for a safe distance, and resembling pearls set into the tender gums of the infant. The case is one of the rarest ever recorded.

Be Cautious.—I am not arguing against progress, but am trying to emphasize the fact that each operator should be sure of his ground before he abandons a thing that in his hands has been proven to be good. Try out all the promising new things, but do not "burn your bridges behind you." That the "dentist of tomorrow" will be a better dentist than the dentist of today is certain. He will profit by the experience of the present day dentist and while knowing what to do he will have a knowledge that is equally important of what not to do.—Dr. A. T. Olmsted, *Dental Review.*

Work Together.—Nothing is more sure than that a compact body of men working together will accomplish more for the advancement of any cause or science than any individual can hope to do by himself. That that has well been demonstrated no one can doubt, when we consider the little progress that the professions of medicine, surgery, and dentistry made while each man kept his knowledge and discoveries to himself; but when it was made available by those of ability, the progress became more rapid, and everyone received more than he gave.—Dr. T. J. Barrett, *Dental Cosmos.*

Our Duty to Enhance the Dignity of the Profession.—In conclusion I wish to say with all the emphasis which is possible, that it is the duty and should be the ambition of every practitioner not only to restore carious teeth in a manner commensurate with our professional status, but to endeavor always to enhance our dignity by elevating to the highest degree of perfection our armamentarium and our *modus operandi.* To do this does not mean employing a portion only of the methods or materials of proved worth at our command, nor allowing conservatism to lose its identity by becoming engulfed in pessimistic reasoning.

The inlay principle is no longer an experiment—thanks to the few lion-hearted pioneers who labored so assiduously—it has long since passed that stage, the experimenting being now centered upon and confined to the best methods of employing the principle, and to the selection and appropriation of the most suitable materials.—Dr. C. S. VanHorn, *Dental Cosmos.*

We must bear in mind that the 1890 Pharmacopeia, as an official guide and standard, is now of no more value than a last year's almanac; and the dentist

or physician who thinks that tincture of aconite represents 35 per cent of the drug instead of 10 per cent, or that tincture of strophanthus represents 5 per cent, instead of double that amount, or who in his writing or speaking refers to phenol as "carbolic acid," or to arsenic trioxid as "arsenious acid." for example, classes himself as obsolete. Dentists, especially, have been open to criticism in this respect in the past. In a comparatively recent dental book the author refers to "ether" as "sulphuric ether," a title that has been obsolete for sixty-five years.—Dr. G. B. Squires, *Dental Cosmos.*

President's Tooth for Sale.—In the window of a little shop in Lexington avenue, New York, is a gold ring with a setting that included two small diamonds and a human tooth. A sign announces that it is the tooth of the twenty-fifth President of the United Sates. The proprietor of the store says that he bought it at an administrator's sale of the effects of Mrs. Julia B. Grover, the woman who committed suicide, leaving all her possessions to President Roosevelt. The tooth is said to be one that reposed in the president's face when he was a boy and which he many years ago gave to this eccentric woman admirer.

Accidents.—Dr. Robert E. Murphy, a young dentist of Huntsville, Ala., was badly scalded while working in his laboratory, Aug. 28.—A vessel of boiling water burst, throwing the scalding water over his arms and breast.—Dr. F. H. Riley of Kansas City was struck by a trolley Aug. 27, causing a badly sprained ankle and bruised hip.—Dr. J. C. Yutzy of Falls City, Neb., was injured in a runaway accident recently, causing two broken ribs.—Owing to the crank of an automobile flying back and hitting him in the face, Dr. A. D. Clark of Charles City, Ia., was hurt badly in the jaw and several teeth loosened.—Explosion of an incandescent globe while he was trying to discover why his electric lights failed to burn clearly nearly blinded Dr. A. L. Wescott, a dentist of Atlantic City. Both eyes were filled with tiny particles of glass, but Dr. Wescott has recovered the sight of one eye and physicians hope to save the other.

Examining Board Affairs.—Governor Johnson of Minnesota has been notified that at a recent meeting of the State Dental Board Dr. R. W. Bechtel of St. Paul was named to succeed Dr. R. F. Orton, who has served two terms and is not eligible for reappointment, and Dr. G. S. Todd of Lake City to succeed himself. Both appointments are subject to executive approval.—According to the annual report of the Board of Dental Examiners of the District of Columbia for the last fiscal year ended June 30 last fifteen certificates entitling the holders to registration as legally qualified to practice dentistry in the District were granted during the past year. The list of certificates now numbers 672. The receipts of this Board of Examiners for the year were $181 and the disbursements $181. Eighteen applicants were examined, fourteen of which certified for registration, four failed to pass the examination. One applicant presented a certificate from his State Board, certifying to his having been in legal practice five years, which applicant is entitled to a certificate for registration without examination as to his qualifications by the Board.—Governor of Texas has appoinnted the following as

members of the Dental Board: J. H. Grant, Palestine; S. B. Duff, Greenville; C. M. McCauley, Merkel. Drs. Grant and Duff were members of the old Board. Dr. McCauley was appointed to take the place of Dr. Weaver of Hillsboro, who did not wish to serve another term.—The second regular examination of the Dominion Dental Council of Canada was held in June. The examination was held in St. John, N. B., Toronto, Ont., and Regina, Sask. Seventy-four candidates took the examination. The holder of a certificate of the Dominion Dental Council is entitled to practice in any Province in Canada except Quebec and British Columbia.

USE OF BLOTTING PAPER, SEALING WAX AND RUBBER.—Use blotting paper as a cavity dryer, cut out with a punch; a vehicle for medicine treatment and drying and cleansing root canal instruments; also use it in place of cotton rolls. Use it as a table cover and drawer lining; as a pad to be placed between cheek and rubber dam holder, and as a lining for medicine trays, shelves, etc.

Use for drying and cleansing plugger points; as a vehicle for applying counter-irritants; for drying rubber dam.

Use sealing wax for forming handles on root canal instruments, using a different colored wax on each size.

Place rubber disks on canal instruments for a guide.

Use an ordinary harness punch for punching rubber disks and blotting paper.—DR. G. L. TETRICH, *Western Dental Journal.*

DUTY OF TEACHER.—Education does not consist simply in the acquisition of knowledge. The great idea underlying all instruction should be to fit and stimulate the scholar according to his individual ability; this of course requires teachers of intelligence and discernment, to whom their calling is not merely a routine business; many who are well qualified for the moral and mental training of children accept the important responsibility with no knowledge of the physical condition, or whether a child is physically equal to the requirements of school life. The teacher should see that the book is held at the proper distance, in a good light, and a study of facial expression and head posture should be made. He should familiarize himself with the symptoms of the teeth, mouth, eyes, ear, nose and throat defects, so that, while he cannot make a diagnosis, he *can* know when there is something wrong.—DR. T. F. GIFFORD, *Dentist's Magazine.*

THE DENTAL PROFESSION SHOULD BE REPRESENTED ON THE PHARMACOPEAL CONVENTION.—Another matter of importance I wish to mention in closing. Dentistry is recognized as a special branch of medicine, and is represented by 35,000 to 40,000 practitioners in this country. A number of medicinal agents used extensively by dentists may seldom be used by physicians. Such articles should be made U. S. P. products. For this reason we should be represented and have a say in the revision of the Pharmacopeia.

Nitrous oxid, for example, is used more extensively in the dental profession than is ether in the medical profession. The former should be made official, so that we may be protected by a standard of purity, etc. Some form of magnesium hydroxid should be made official. Sodium dioxid, trioxymethylene,

and other agents used more or less extensively by dentists should be included. Certain peroxid compounds, such as calcium dioxid, strontium dioxid, sodium perborate, and others, that give off oxygen when brought in contact with water, are being used in tooth-powders. The advisability of introducing any of these into the Pharmacopeia should be investigated and decided, to a certain extent, by dentists. We cannot do these things unless we are represented at the convention.—Dr. G. B. Squires, *Dental Cosmos.*

Laboratory Work.—Dentistry is reaching the point where only those operations which are absolutely necessary are performed in the mouths of the patients. We are trying to protect our patients from unnecessary "mouth manipulation." Work which may be successfully performed outside of the mouth is taken to the laboratory. The laboratory, however, should be convenient to the operating room so that, whoever performs the work, the operator can supervise it. No one knows what is required for a completed prosthetic appliance so well as the operator who studies the conditions of the mouth. The bulk of the work may be done by an assistant, but the critical stages should be supervised by the operator who knows, or should know, what is required in every detail of the work to produce the most useful and artistic results. The operators who are too busy at the chair to superintend the construction of their prosthetic cases should send such cases to one who can give them the attention necessary.—Dr. G. W. Johnson, *Dental Review.*

Dental Meetings Are the Places from Which Knowledge to the Public Should be Disseminated.—The place to discuss ways and means for spreading enlightenment and education along this line is in dental meetings. It is our duty as professional men to obtain and disseminate accurate information that will be beneficial in promoting and improving the general public health, and in pointing out conditions that we consider dangerous to it. The first step of progress in this direction must come from us, and we must create and awaken an interest among our citizens generally, on the importance of sound teeth for the healthy development of the child. It is believed that if communication between mouth and mouth can be prevented, communicable diseases can be largely diminished. What is there, then, more necessary to public health than clean and wholesome habits of oral hygiene? In our public schools, where habits of personal neatness and cleanliness are being taught, what is more important than to give instruction on the care of the teeth and mouth?.—Dr. T. J. Barrett, *Dental Cosmos.*

Blue-Ray in Dental Therapeutics.—A seven-year-old boy with the lower right first molar, filled one and one-half years before, badly abscessed, and so painful that the child had not slept for three nights. It was very sensitive to percussion; in fact, all the indications of an acute abscess were present. Making an appointment for a later hour, I set about devising an apparatus for using the ray. Needless to say, that apparatus was crude; the results, however, were noteworthy. After thirty minutes' exposure to the blue ray the tooth could be tapped sharply without pain; the ache was entirely gone, and the swelling completely reduced. The patient enjoyed an uninterrupted

night's rest, and the next morning I removed the old filling and cleaned out the tooth. Here I had a second demonstration of the efficacy of the blue ray. In cleaning the putrescent canals a particle of the cleansing agent apparently found its way through the apical foramen, causing excessive pain. Thirty seconds' exposure to blue light brought complete relief, and the filling was completed without further inconvenience.—Dr. W. J. Hodson, *Dental Cosmos.*

Metallic Bases vs. Vulcanite.—If we had specialists in prosthesis it is reasonable to believe vulcanite would be used only in temporary work and would be considered more or less an emblem of incompetence. Gold would be more generally used and no doubt aluminum would be as common as vulcanite is to-day. The failures of aluminum, where not due to faulty manipulation, swaging, etc., are rare. If we gave proper consideration to the failures of vulcanite we would cease considering the failures of aluminum. Vulcanite is a non-conductor of heat, consequently keeps the tissues unduly heated and causes undue resorption. To scientifically make a vulcanite plate requires as much labor and skill as any work required of the prosthetist. Rubber vulcanized between metals, such as tinfoil, possibly gives a glazed surface that is hygienic. In that respect it might somewhat equal aluminum; but at the same time we cannot overcome the objection of its being a non-conductor of heat, to say nothing of the advantage of the uniform thickness of aluminum or a metal base.—Dr. F. A. Dillie, *Dentist's Magazine.*

Robberies.—Burglars entered the office of Dr. J. Cunningham of Princeton, Ind., on Aug. 29, and stole dental gold, instruments, etc., valued at $75.—Instruments valued at $40, some clothing and an empty savings bank, one containing several dollars being overlooked, were stolen from the dental office of Dr. G. A. Kraus of Louisville, Ky., on Sept. 5.—The offices of three Houghton (Mich.) dentists were entered on Aug. 16 and $300 worth of gold stolen.—T. H. Beckwith of Omaha, Neb., has been sentenced to thirty days in jail for stealing a number of gold fillings from Dr. E. A. Mason.—Dr. Charles W. Monroe had $500 worth of gold stolen from his office in Parkersburg, W. Va.; Dr. A. J. Minx $200 in gold fillings, crowns and bridge work, and Dr. J. W. Roberts $100 in gold.—A showcase belonging to the Ogden Dental Co. of Ogden, Utah, was broken into Aug. 14 and articles valued at $60 taken.—A thief evidently familiar with the plan of the dental office of Dr. A. B. Crawford of Martins Ferry, O., entered same Aug. 17 and stole gold bridges, teeth and gold amounting to $150.—Four dental offices in Zanesville, O., were entered recently and the owners relieved of about $200 worth of material.—A large quantity of gold leaf was stolen from the office of Dr. J. D. Reid of Pana, Ill., Sept. 10.—Ed. Weir of Burlington, Ia., is under arrest for having stolen tools and appliances from the dental office of Dr. J. B. Martelle.—Dr. B. O. Chapman had $300 worth of gold plate stolen from his office in Elmira, N. Y., and Dr. Henry Peterson had articles valued at $50 stolen from him.—Gus Rosenberg of Topeka, Kan., was fined $1 and costs and sentenced to thirty days in jail for the alleged pilfering of gold and

other valuables from dental offices.—James Burns is held under bonds of $500 charged with burglarizing the dental office of Dr. J. A. Bishop of Pontiac, Ill —Sept. 5 the dental offices of Drs. W. P. Moore and W. F. Baron, of Marion, Ill., were entered and about $100 worth of gold taken.

ILLEGAL PRACTITIONERS.—Two San Francisco dentists were arrested August 24 for practicing dentistry without licenses. Each was released on $50 cash bail. The complainant was G. M. Dexter, an agent of the State Dental Association, who also had a Chinese practitioner of Oakland arrested on the same charge September 4.—A young man of Butte, Mont., was found guilty of practicing dentistry without a license August 24. Sentence reserved. The defendant's attorney claimed he made set of false teeth just as carpenter works at new house, another superintended job.—A dentist of Flora Vista, N. M., charged with practicing dentistry without a license, pleaded not guilty as charged, was fined $20 and costs, whereupon an appeal was filed to carry case to the District Court.—Illegal practice is charged against the manager of a dental concern in Elmira, N. Y. The complainant is a young woman detective, said to be an agent of the New York Dental Society, who claims that he pulled teeth, made gold crowns and did other dentistry without a license. A plea of not guilty was entered and an adjournment taken until September 26.

DENTISTRY IN SMYRNA.—To meet the several inquiries made of Consul E. L. Harris regarding opportunities for American dentists in Smyrna, he submits the following report: Up to a comparatively recent date the art of dentistry was practically unknown in the Levant. Extraction was the sole remedy for a toothache, and barbers were generally the only operators. At present the number of dentists in Smyrna is very large, although but few of them have had a scientific training. There are two graduates of the Philadelphia Dental College and three who have been through a course of study in Europe. These dentists have a good practice and are doing well. Their prices range, for a gold filling, between $4 and $4.50, and average $2 for cement fillings. Dental supplies, especially artificial teeth, are purchased almost exclusively from England, although many specialties are of American origin. In value these imports amount on an average to $50,000 per annum. The reason for this indirect trade is that London houses have secured from American manufacturers the exclusive right of the sale of their products throughout the Continent. These houses have branches in all principal centers from where traveling men are sent out with stocks of supplies to the tributary towns. Such a branch exists at Constantinople. A representative passes through Smyrna twice a year and spends five or six days visiting local dentists and providing them with the necessary supplies. Credit terms are allowed to responsible parties. American dentists have occasionally made short stays in Smyrna and have found it very profitable in spite of the improvised nature of their installations. Taking into consideration the high reputation that is attached to American dentists, and also the fact that the number of people who take regular care of their teeth is continually increasing, an American practitioner would find a stay of a

few years in Smyrna a paying undertaking. The cost of living here is rather low, and for about $35 per month attractive quarters could be secured in a central locality. It must be borne in mind that the furniture of the rooms should be very tasty, and that the mechanical outfit should be complete. Rival local dentists are well equipped in this respect. It would be further advisable, before coming to Smyrna, to have a certain amount of advertising in the press; a few advanced notices which would be looked after by this office.

TIME BASIS FOR FEE CHARGED.—I believe I can tell why so many operators put in poor amalgam fillings. I ascertained this from personal experience. It is because you do not do the work on a time basis. If you fix a standard price for amalgam fillings, whether it be fifty cents, a dollar or two dollars per filling, and you are bound to acquire the habit of inserting the fillings in as short a time as possible, no matter what the requirements of a particular filling are. I charge just as much for a gold filling, just as much for cleaning the teeth, and just as much for an amalgam filling, according to the time required to perform the operations. When you get upon that basis, you will put in a great many more fillings that are satisfactory, than you can do on the fixed price basis. I have put in fillings that I expected to finish in ten minutes, but which took me an hour. I will admit that I have allowed some patients to go before I had properly finished my work, and I was doing wrong; but in the last few years, when I have done everything on a time basis, I find it an inspiration to do better work, and patients, as a rule, are better satisfied. And you can all do this, whether you are practicing in a large city, or a small town.—DR. J. P. ROOT, *Western Dental Journal.*

OFFENSIVE BREATH AND ITS TREATMENT.—Although seldom, if ever, mentioned in dental papers, it is the writer's belief that an offensive breath is an existing condition (both among patients and the dental surgeon) of sufficient percentage and importance as not to be considered insignificant.

To begin with "A Foul Breath" may be due to a variety of causes, the most important of which may be said to be as follows:

First—Carious teeth.

Second—Food fermenting in the mouth.

Third—Digestive disturbance with constipation.

If, after eliminating the two first mentioned causes, by operative procedure and prophylactic manipulation respectively, we find that the condition still exists, let us first determine that catarrh of the nose or throat does not exist and proceed with the following instructions to our patient:

"Please, Mr. Blank, discard the use of cathartics, and in their stead, upon arising in the morning, lie upon your back and with muscle resistance, force your limbs up over your head for fifteen times or more. Following this, force your body up to a right angle position with the same amount of muscle resistance, keeping your limbs in contact with the floor for about the same number of times. This to

be repeated before retiring; drink a couple of glasses of hot water before breakfast, eating an apple and its peel; breakfast to consist of cereals, preferably oatmeal, or eggs, or oatmeal and eggs; dinner should not be indulged in too heavily, bearing in mind that too much is worse than too little; supper should include stewed prunes, the following prescription to be lived up to:

℞ Pepsin ..... ℥iss
Dil. Hydrochloric acid..... ℥iii
Aquæ q. s. ad..... ℥iv
M.
Sig. Dessertspoonful in water t. i. d.

"Dents" Barred at State "U."—Refused entrance to the University of Minnesota, not because of low scholarship nor bad conduct, but simply because they did not secure a place near the front in the registration line, September 9, 52 junior and senior "dents" have determined to fight to the finish to be allowed to complete their course. Because of lack of facilities in laboratory and operating space the dental department announced last spring that only 58 juniors and 44 seniors would be received, and that the rule would be "first come, first served." This was done, in spite of the fact that there were then in the dental college 70 men ready to become seniors and 53 prepared to enter the junior class. Dean Owre said: "It is not that we will not permit them to enter; we can't. It is a physical impossibility. Many of those excluded have a high grade of scholarship and their parents are pioneers in this state. If a man missed his train he couldn't register. This school is so well known that twenty-seven students in other colleges wrote to me last year about completing their course here. But we can't do it." The situation is a unique one in the history of the State University, and was caused by the refusal of the last legislature to provide for new medical buildings.

Practical Form Guides for Use in Prosthetic Work.—Text-books on prosthetic dentistry devote a considerable amount of space to the consideration of temperament in its relation to the selection of tooth shades for complete dentures. Students in the dental schools are taught the principles relative to the four distinctive types, viz., lymphatic, bilious, nervous and sanguinous, together with the various combinations of these four types, and in addition they are taught the shapes and contour of the teeth, as well as the shades indicated in these temperamental types. But in this day of teaching by illustration, it would seem that the student and young practitioner could be better equipped in the knowledge that applies directly to the arrangement of teeth upon the articulator if he had something more than a theoretical idea of the subject.

It has occurred to me quite recently that a set of vulcanite forms, such as those used in technic work, representing a full upper and lower arranged in characteristic imitation of the various temperaments indicated, would prove a valuable guide, not only to the student and young practitioner, but even to the man of experience, in the placing of teeth upon the articu-

lator. A great majority of those in practice to-day are spending such a large portion of their time in the restoration and repair of the natural teeth, and their thoughts are so concentrated along these lines, that they have neither time nor disposition to devote to this phase of prosthetic work.

As a consequence, they are confronted with their incompetence whenever called upon to make a full upper and lower denture. It may be that we excuse ourselves in the thought that our services are not sufficiently appreciated to warrant the expenditure of the hours which we ought to spend in arriving at the perfect arrangement of teeth on trial plates. We all see evidences of our errors, and the mistakes of others, almost daily.

Faults in arrangement are as glaring as faults in shade and contour of artificial teeth.

My notion is that we should have at hand forms, say, twelve in number, four to represent the typical temperamental divisions, and eight, the modifications of these divisions, showing the arch, its general contour, etc., together with the characteristic shape, size and arrangement of teeth to correspond. These forms could be compared directly with the models of the case in hand and the mouth of the patient, and as a consequence the teeth indicated could be selected and arranged in an intelligent manner. After completing this part of the process, the trial plates could be tried in, and such simple changes made as would give to the case the individuality so essential to the perfection we desire.

In the general run of cases which come to our notice it would seem that security and correct occlusion were the only two points sought by most practitioners.

Surely there are ways in which the work of the conscientious, painstaking prosthetic workman can be designated from that which is the product of the "dental parlor."

I believe the form guides would aid a great many men in improving the character of this class of dentistry.—H. C. KAHLO, *Dental Summary.*

A NEW REMEDY FOR PYORRHEA ALVEOLARIS.—Pyorrhea alveolaris is a term given to cover the whole gamut of the disease as ordinarily understood, but when this title is applied to that phase of the disease wherein there are no deposits upon the teeth and no flow of pus, then it is a misnomer. As stated before, it is not to discuss pathology herein, but to present a remedy for the flow of pus from the alveolus, and for that purpose I desire to present the merits of zinc sulphocarbolate as a medicament of great efficiency. It is obtained by heating a mixture of phenol and sulphuric acid and saturating the product with zinc oxid, then evaporating and crystallizing. Zinc sulphocarbolate is found readily in the drug stores and consists of colorless, transparent, and efflorescent crystals which are soluble in about twice their weight of water. From the ingredients of this material it is readily observed that it offers a compound that should prove valuable in the treatment of pyorrhea alveolaris in nearly all of its phases. The United States Dispensatory says that zinc sulphocarbolate is an antiseptic, astringent, and stimulant to indolent

or foul ulcers and in subacute inflammations of the mucous membrane. Practical experience has proven to me that this remedy acts as an astringent, contracting the gums and the tissues about a loosened tooth more rapidly than any other means employed. It is therefore useful when the gingivæ are swollen, as, for instance, after the setting of crowns or the adjustment of bands in orthodontia. It is useful in sinuses, but should not be forced into tissues with no outlet. I have never observed any detrimental effect upon any of the tissues of the mouth. Being refrigerant, zinc sulphocarbolate may cause some complaint because of its coldness, but warming the solution will modify this difficulty.

In the treatment of pyorrhea, my treatment is usually a 10 per cent solution in cinnamon water. The solution is colored with tincture of cudbear. Give the patient a bottle of this to massage the gums between treatments. Inject the solution into the pocket with a good syringe having a long, slender needle that will reach the bottom of any pocket. The Sub "Q" syringe with a gold needle is very good. Carry the point as deeply as possible and flood the pocket and use force enough to carry the fluid to all parts, then quickly massage the gums. Care should be given not to force the solution too hard into the pockets, as that will cause pain, no matter what might be used. After the injection flood the mouth with warm water from the water syringe. Of course this treatment follows the removal of deposits from the roots of teeth and necrosed bone, if any. This treatment should begin at the first sitting, even though all deposits are not removed, since it may require a number of sittings to accomplish the surgical treatment. Subsequent sittings enable one to discover the location of remaining deposits by the deep or injected color of the gingivæ. From one to half a dozen treatments will stop the flow of pus in many instances. My observation is that there is no return of pyorrhea in the majority of cases. I may have been fortunate in having good cases, but in one test case which was not seen for a full year after the zinc sulphocarbolate treatment there was but one tooth in almost an entire mouthful of affected teeth that became affected again. Another case rferred to me by a neurologist in which the tongue had a peculiar sensitiveness upon its side was also a severe case of pyorrhea. Within a month the pyorrhea disappeared, as well as the aforesaid disturbance, and neither has returned. This is a case of over a year's standing, but prophylactic treatment is continued monthly.

The first case in which this remedy was used was a small abscess upon the root of an upper incisor. The swelling was about the size of a pea. One injection of the zinc sulphocarbolate was given and the following day the gum was flat and the condition so near normal that it was, indeed, surprising.

These cases have been mentioned to show the unusual efficiency of zinc sulphocarbolate. However, it must be stated that all treatment of pyorrhea alveolaris must be preceded by surgical methods—*i. e.*, removal of deposits upon the teeth, necrosed bone, or resorbed roots having the apex reduced

to a needle-like sharpness removed. We must also remember that all cases are not curable.

In conclusion, let me say that having used this remedy for more than a year, it is found to be giving good results, and is growing in favor among some of my professional friends who have tried it.—Dr. W. H. Whitslar, *Dental Review.*

Light in Operating Room.—The operating room deserves more attention than is usually accorded it. It should be of fairly good proportions and well ventilated. Men may differ as to whether they prefer north, south, or other light. One thing is certain, that most operators ruin their eyes by the use of too much light. The idea of flooding an operating room with a strong light is all wrong. Above all, avoid cross lights. Preferably get your light from a window of good height, and so arrange your blinds to avoid a strong light in your own eyes, but rather to direct it to the oral cavity of your patient.—Dr. C. M. Abbott, *Dominion Dental Journal.*

Marriages.—Earl B. Knight, a dentist of Monmouth, Ill., was married to Miss Hazel G. Muckler of Chicago, Aug. 19.—W. E. Blair, a dentist of Keithsburg, Ill., was married to Miss Mary Louise Kistinger of Ransom, Aug. 25.—Chester Wiley, a dentist of Aurora, Ill., was married to Miss Mary Falhemus, also of Aurora, Sept. 6.—Thomas E. Williams, dentist of Nevada, Mo., was married to Miss Maude Lackey of Marshalltown, Sept. 4.—Boyd F. Bowles, a dentist of Wollaston, Mass., was married to Miss Elsie M. Best of Waterville, N. S., Sept. 4.—Charles Mair, a dentist of Laredo, Mo., was married to Miss Icy Wood, also of Laredo, Aug. 20.—Howard O. Wearstler, a dentist of Barberton, O., was married to Miss Nettie Seeger of Bucyrus, Sept. 1.—James McNair Stover, a dentist of South Boston, Va., was married to Miss Margaret Baxter Bell of El Paso, Tex., Aug. 28.—Barnett P. Wilson, a dentist of Rockville, Md., was married to Miss Annie R. Owen of Lynchburg, Va., Aug. 23.—Arthur J. Jessel, court dentist at Stockholm, was married to Miss Francis O'Conner of Buffalo, Sept. 3.—J. C. Murdock, a dentist of Peoria, Ill., was married to Miss Eva Major of Decatur, June 28.—Charles A. Thomas, a dentist of Arlington, Mass., was married to Therese Eva Bonney, a dentist of West Somerville, Aug. 27.

Some Observations on the Bacteriology of Pyorrhea Alveolaris.—Although a great deal of experimental work has been performed on this subject, we are still unable to determine the particular agency responsible for the causation of those forms of chronic suppuration grouped together under the name pyorrhea alveolaris. It has been quite conclusively shown that among suspected organisms which are capable of ready cultivation, there is none that occurs with anything like sufficient regularity to suggest its having any causative action, and even in those cases in which there is a large amount of pus the proportion of occasions on which the common pus cocci are present is extremely small, and it may justly be inferred that the usual suppurative bacteria have little, if any, relation to pyorrhea.

The author has examined, both clinically and bacteriologically, twelve typical cases exhibiting the pyorrheal condition in different stages. The

clinical history of these cases showed such previous general constitutional influences as influenza, rheumatic fever, diabetes, syphilis, and, in one case, a persistent state of low vitality following confinement. A blood-count was also taken in each case, and although anemia was present in all but one case, it was not of so profound a type in any case as has been reported by K. W. Goadby (see *British Medical Journal*, 1905, pp. 68-74). Under the microscope the pus from these cases showed the presence of every conceivable variety of bacteria—cocci, bacilli, spirillæ, vibrios, and thread-like organisms. Small diplococci, which represent the streptococcus brevis, are always present, but as they have no pathologic significance they may be neglected. Groups of staphylococci may also be invariably seen, but their presence is revealed to much greater extent in culture tubes. A few vibrios and spirals can usually be found in healthy mouths, but in any inflammatory condition their number becomes very much increased, and this is particularly well marked in case of pyorrhea. While bacilli of every size and shape were met with, the investigator draws particular attention to the very large forms, quite unique in appearance, known as fusiform bacilli. Vincent and Simonin of Paris have commented on the association of spirillæ and fusiform bacilli in some of the pseudo-diphtheritic affections in the throat, and particularly in the tonsils. In each of the twelve cases examined by Mr. Simms the association of these two forms was observed, especially the fusiform bacilli, which persisted after active periods of treatment. These rods taper to a point at each extremity and are exceptionally long, attaining often a length of fifteen microns; they are frequently slightly curved, and a close examination sometimes reveals the presence of transverse striping or vacuolation.

The author describes in detail his cultivation experiments, and those carried on with the view of determining the virulence of the several organisms. Nearly all the organisms isolated were introduced into guinea pigs, but most of them proved to be quite innocuous, except the spirillum already referred to, which caused the death of the animal in five days, without, however, any signs of suppuration.

The varieties that caused abscesses to appear were the typical pyogenic cocci and those staphylococci which the author has designated as atypical, because they do not conform to the usual culture or staining reactions. One of the guinea pigs, into which pyorrheal pus in broth was injected, appeared likely to die, but recovered with a marked paralysis of its hind limbs—a point in favor of the supposition that there is a toxic element in pyorrhea.

In concluding the author states that the opinion held by many that pus-forming cocci in pyorrhea are of so little importance that they may be neglected is not tenable at all, for there undoubtedly exists in these cases a variety of cocci which, although differing in certain technical respects from the usual type, are yet as truly pyogenic as the others. With regard to the association of the spirillæ and fusiform bacilli it is the belief of Mr. Simms that these types of bacteria are capable of setting up those initial changes in the gums and periosteum that are so typical of pyorrhea alveolaris.—Dr. Harold Simms, *Dental Cosmos.*